



OIL AND GAS CLIMATE INITIATIVE

Building towards net zero

PROGRESS REPORT 2023



Credit: Adobe Stock

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CEO foreword

As CEOs of OGCI's member companies, we support the goals of the Paris Agreement, limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. And we recognize that there is a real urgency to act.

This requires international collaboration, an energy transition and a reduction in greenhouse gas emissions from oil and gas.

OGCI and its member companies, by taking individual and collective actions, will help accelerate the energy transition through deep reductions in greenhouse gases.

Our companies together produce almost a third of the world's oil and gas.

That energy is helping to power the global economy through transport and communications, factories, businesses, homes, schools and hospitals. And it is used to manufacture products that are part of our everyday lives - from smartphones to clothes and cars to medical equipment.

We have an important role to help accelerate the transition to net zero, while continuing to ensure the secure supply of reliable and affordable energy.

To achieve a net zero economy, we are investing in the energy system of the future – including in renewables and biogas, low-carbon fuels such as biofuels, and hydrogen, carbon capture and storage, and carbon removals technologies such as direct air capture.



"Over the past decade, OGCI has transformed from a conversation among CEOs into a group that drives ambition in the industry while supporting the hard daily work of decarbonization."

Bob Dudley, OGCI Chair and leader of the CEO Steering Committee



L-R: Repsol CEO Jose Jon Imaz and TotalEnergies CEO Patrick Pouyanné at a face-to-face meeting of the group. Credit: CERAWEEK

Last year, our member companies invested just over \$24 billion on low-carbon technologies, including acquisitions, and research and development.

This is almost 66% higher than the previous year and brings the total we have invested in low-carbon technologies since 2017 to \$65 billion.¹

To strengthen cooperation and spur greater collaboration on measures and approaches to tackle the climate challenge, we have increased the frequency of our engagement with each other over the past year through virtual and face-to-face meetings.

Meeting in person has enabled us to have an open discussion and share knowledge and ideas with each other and explore what's possible.

These meetings have helped us accelerate the development and adoption of key goals, targets, strategies and initiatives to support net zero – both for the group and for individual companies.

And it has allowed us to demonstrate to the broader industry the actions that can help reduce emissions.

These are some highlights of the progress we made in the past year.

In 2022, the group's collective greenhouse gas emissions continued to decrease,² thanks to activities such as reducing methane emissions and flaring volumes.

¹ OGCI Performance Data
² OGCI Performance Data



L-R: Climate Investment CEO Pratima Rangarajan, Occidental CEO Vicki Hollub, Aramco CEO Amin Nasser, and TotalEnergies CEO Patrick Pouyanné at a face-to-face meeting. Credit Rob Greer.

This has put us on track to achieve OGCI's collective upstream carbon intensity target of 17 kilograms per barrel of oil equivalent by 2025.

Having achieved our methane intensity target of 0.2% ahead of schedule, we're striving for near zero methane by 2030 in line with the Aiming for Zero Methane Emissions Initiative, which OGCI launched last year.

Support for the initiative, which is open to companies across the sector, now numbers over 90 and includes private and state-run energy companies, service

firms, technology providers, non-governmental organizations and consultancies.

To help other companies in the oil and gas industry reduce methane emissions at their facilities, this year we approved an expansion of OGCI's Satellite Monitoring Campaign to more countries. The campaign has already been successfully running in Iraq, Kazakhstan, Algeria and Egypt.

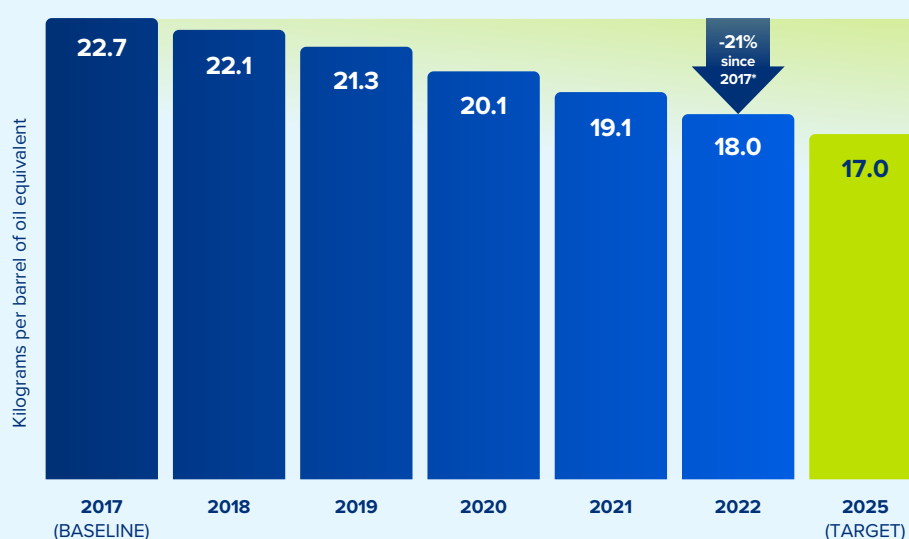
To support the decarbonization of hard-to-abate sectors such as steel, cement and petrochemicals, we have focused on accelerating the development of global CCUS hubs.

Our companies are now actively involved in developing 40 large-scale CCUS hubs around the world, which have the potential to remove up to 300 million tonnes of CO₂ a year by 2030.² This is equivalent to shutting down 80 coal power plants or removing the emissions of 67 million cars.³

These results demonstrate the importance of OGCI's role.

This work has helped us to reduce emissions. And we hope it will inspire other companies in the oil and gas industry by demonstrating what's possible as we help to build a strong foundation for a net zero future.

OGCI upstream carbon intensity down 21% since 2017⁴



² Based on reported CCUS projects which average 7.5-10 mt each. See [CCUS Hub](#).

³ Calculated using the [US EPA GHG equivalencies calculator](#)

⁴ OGCI Performance Data



Amin Nasser
CEO Saudi Aramco



Murray Auchincloss
Interim 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



Jean-Paul Prates
CEO Petróleo Brasileiro
SA



Josu Jon Imaz
CEO Repsol S.A.



Wael Sawan
CEO Shell plc



Patrick Pouyanné
CEO TotalEnergies SE

OGCI highlights



OGCI member companies' total oil and gas production in 2022¹

43.9

Mboe/day

27%

of global output²

1.1%

of global greenhouse
gas emissions³



OGCI members' total upstream greenhouse gas
emissions reductions in 2022 vs 2017⁴

-21%

carbon intensity

-50%

absolute methane
emissions

-45%

flaring of greenhouse
gas emissions



OGCI member companies' total low-carbon investment⁵

\$24.3 bn

total in 2022

+66%

2022 vs 2021

\$65 bn

total since 2017



CCUS hubs in 2022 with OGCI member involvement

40

hubs with OGCI member
involvement⁶

~300 mt

of CO₂/year potentially stored by
2030 from OGCI member projects⁷

1 OGCI Performance Data

2 On an operated basis. Provisional estimate of global oil and gas production of roughly 162 Mboe/day in 2022, based on IEA indicators for oil supply of 94.8 Mboe/day and global natural gas production of 67.3 Mboe/day. [IEA January Oil Market Report](#); [IEA 2023 Gas Market Report Q1](#)

3 Using latest 2021 data from [UNEP's Emissions Gap Report for 2022](#). 2021 data for total GHG emissions excluding LULUCF is 52.8GtCO₂e

4 Operated. OGCI Performance Data

5 Includes investment, acquisitions and R&D.

6 [CCUS Hub](#)

7 Based on reported CCUS projects which average 7.5-10 mt each. See [CCUS Hub](#).



Methane emissions



Operators at a Saudi Aramco facility. Credit: Saudi Aramco

Methane emissions

When our member company CEOs launched OGCI in 2014, they highlighted the need to address methane emissions. This remains a critical issue for OGCI.

Our members have demonstrated that a significant portion of methane emissions in the oil and gas industry can be reduced at many locations at relatively low cost.

They have done this by introducing new processes, technology and equipment to mitigate leaks and avoid venting and flaring not required for safety, maintenance and mechanical integrity.

According to OGCI's latest Performance Data, our members have collectively halved absolute upstream methane emissions, and reduced upstream flaring of greenhouse gas emissions by 45%, hitting OGCI's collective upstream methane intensity target of well below 0.2% in 2021 — four years early.

OGCI members' collective upstream methane intensity is now 0.15%, down from the 0.3% benchmark in 2017. The group collectively emits around 1 million tonnes of methane a year total from the global assets they operate. That compares to an estimated total of 82 million tonnes of methane emissions a year from the entire oil and gas industry.¹

OGCI's collective upstream methane intensity target of well below 0.2% is now used as a benchmark more broadly across the industry and in legislation.

For example, it was referenced in Environmental Defense Fund's Certification White Paper (2022)² and partially adopted in the US's Inflation Reduction Act, which was signed into law in August 2022.³



Why methane emissions must be abated

- Methane is a more potent greenhouse gas than carbon dioxide. But it's much shorter-lived in the atmosphere.
- Continuing to focus on reducing methane emissions can deliver a significant near-term reduction in the pace of global warming.
- The energy sector, including oil, natural gas, coal and bioenergy, accounts for nearly 40% of methane emissions from human activity. Other sources of emissions include agriculture and landfills.⁴
- Eliminating methane emissions from oil and gas operations is one of the quickest ways⁵ to accelerate progress towards the Paris Agreement climate goals.

Our members are continuing to develop processes and technological solutions to eliminate nearly all methane emissions from their own operations while engaging with other companies throughout the industry – sharing best practice, technology and building capability to enable further reductions.

OGCI members are doing this through our [Aiming for Zero Methane Emissions pledge](#), partnerships with other initiatives such as the Methane Guiding Principles and UNEP's Oil & Gas Methane Partnership 2.0, and a further extension of our flagship [Satellite Monitoring Campaign](#).

¹ IEA Global Methane Tracker (2023)

² EDF: Certification of Natural Gas With Low Methane Emissions: Criteria for Credible Certification Programs

³ US Inflation Reduction Act

⁴ IEA Global Methane Tracker (2023)

⁵ IEA Global Methane Tracker (2023)



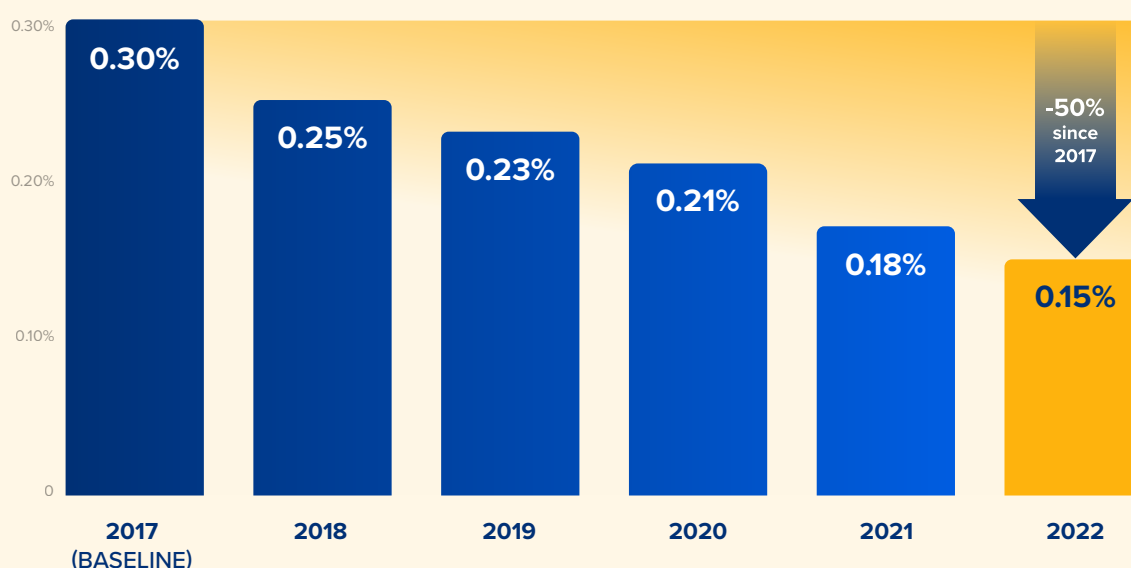
OGCI collective upstream methane intensity target⁶

The upstream methane intensity target has helped change the way many companies address methane emissions at their operations.

Member companies have reduced upstream methane intensity from their operated oil and gas assets by an average of 17% in 2022, a decrease of 50% compared with the 2017 baseline.

OGCI member companies' aggregate methane intensity is now 0.15%, already achieving the 2025 target of well below 0.2%. Importantly, this improvement in intensity has translated into a 50% decrease in absolute upstream methane emissions since 2017.

OGCI upstream methane intensity halves since 2017



Satellite Monitoring Campaign

New technologies, including monitoring with satellites, aircraft, drones and fixed sensors, make it easier to detect and better quantify methane emissions, allowing the oil and gas industry to address methane emissions more rapidly and systematically.

We successfully demonstrated the value of using satellite monitoring through [a pilot campaign in Iraq in late 2021](#).

In that campaign, we commissioned GHGSat, a Climate Investment portfolio company, to collect satellite data on methane plumes over six sites in Iraq.

We then worked with GHGSat and Norwegian consultancy Carbon Limits to engage with local operators, using the data to help identify emissions sources, and sharing industry knowledge, expertise and information on potential solutions to support the operators to abate the methane emissions that were detected.

The pilot project helped one operator to address emissions at the site by rerouting part of the

⁶ OGCI Performance Data



previously vented gas to another facility where it now powers operations.

Investigation and abatement work is underway at three other sites where methane emissions were

detected. No methane emissions were detected by GHGSat technology at the other two sites in Iraq.

Building on the success of the pilot, the campaign was extended in 2022 to additional sites in Iraq as well as new locations in Kazakhstan, Algeria and Egypt. Results from this second phase are expected later this year.

In 2023, we received the go-ahead from our members' CEOs to expand the campaign to help more companies who aren't members of OGCI detect and monitor methane emissions at their facilities. Our member companies then share knowledge and expertise on potential solutions to support abatement of the methane emissions that were detected. Results from this third phase are expected in 2024.

"Reducing methane emissions from oil and gas operations to near zero will be essential to achieving the Paris Agreement ambitions and that's why we've made it a priority for our work at OGCI."

Bjørn Otto Sverdrup,
OGCI Executive
Committee Chair



Aiming for Zero Methane Emissions

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

Support for the initiative, which is open to the entire industry, has grown quickly. It now numbers over 90 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 recognize that virtually all methane emissions from the industry can and should be avoided.

Signatories to the initiative 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 endorse the initiative, encourage new signatories to join and where relevant support signatories as they reduce their methane emissions.

The initiative's clear and straightforward ambition aims to help companies galvanize 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.

The ambition to aim for zero methane emissions from operated oil and gas assets by 2030 is already becoming a standard reference point, as our upstream methane intensity target did before it.

[Go to Aiming for Zero →](#)



AIMING FOR ZERO
Methane Emissions Initiative



OGCI pathway to near zero methane

In August 2023, OGCI published [guidance](#) on how to achieve near zero methane emissions. The guidance is designed to support operators' efforts to reduce their methane emissions.

The guidance recommends that operators focus efforts on the most significant opportunities to mitigate methane emissions and to embrace new technologies that will help deliver continuous improvement. It sets out a four-step pathway:

1. Identify potential sources of methane emissions
2. Take an inventory and determine how emissions will be mitigated
3. Prioritize the biggest opportunities
4. Take a systematic approach

The process is designed to be implemented across a company's business units at any asset or location, and will build on lessons learned, best practice, new technologies and existing and new regulations.

The guidance also 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.

Other OGCI initiatives to lead the industry on reducing methane emissions

We support the implementation of well-designed regulations to reduce methane emissions from existing and new sources and we're working with international institutions, think tanks and organizations to develop programs and tools to monitor and measure methane emissions and identify abatement potential.

Our work with other methane initiatives also focuses on identifying synergies to maximize the potential and ensuring alignment to avoid duplication of efforts.

Improving identification of methane emissions

- We're working with the Methane Guiding Principles and others to establish common industry practices to deploy technologies effectively onshore and offshore.

Detection and quantification technologies

- We have 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 filter to aid technology selection

Increasing scientific knowledge

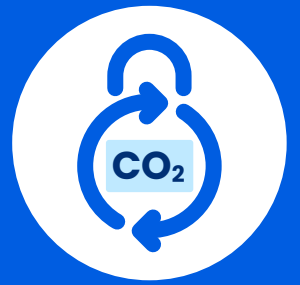
- OGCI has been a primary funder of Methane Science Studies, overseen by the government-led Climate and Clean Air Coalition.⁷
- This work has increased scientific knowledge and understanding of methane emissions from different types of sites across the global oil and gas industry.

Reducing flaring

- Since 2020, we have supported the World Bank's Global Gas Flaring Explorer platform to help improve transparency in flaring data from satellites.

⁷ Studies available on the [CCAC website](#)

CCUS



Norway's Petroleum and Energy Minister
Terje Aasland visiting Northern Lights CCUS
hub in Norway. Credit: Northern Lights

CCUS

The role of carbon capture, utilization and storage (CCUS) in tackling the global decarbonization challenge has advanced since OGCI was founded in 2014.

Leading institutions, including the UN's Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), recognize the role of CCUS in reducing carbon dioxide emissions and achieving net zero greenhouse gas emissions cost effectively.

CCUS is now widely viewed as an essential technology that can decarbonize hard-to-abate industries such as steel, chemicals and cement. It can also enable the production of lower-carbon fuels and products such as hydrogen, and help decarbonize parts of the power sector.

The build out of CCUS infrastructure will also support the deployment of carbon dioxide removal technologies such as bioenergy with CCS (BECCS) and direct air capture with storage (DACs) that can help address existing and historic greenhouse gas emissions to achieve net zero.

Today, OGCI members have integrated CCUS into emerging carbon management business models that can help decarbonize their own refining and chemical businesses while also helping their industrial customers reduce emissions. Using the language of carbon accounting, CCUS helps to address Scope 1, 2 and 3 emissions.

In the years that OGCI has been working on CCUS, the landscape has changed significantly.



A decade ago, the technology was generally viewed as an expensive way of decarbonizing the power sector and it was struggling to attract support as the cost of using renewables to generate power fell.

And there was little collaboration across industries, policymakers and other stakeholders on policy frameworks and business models.

The shift in perception has come about as OGCI and other organizations have worked to help the industry broaden its approach to include the build out of large interconnected regional CCUS hubs that can store emissions from multiple different high-emitting industries using shared transport and storage infrastructure.

The CCUS hub approach can help reduce risks, including technical, project management and financial, by working across sectors and scaling up ambitions to achieve economies of scale.

Spreading the cost of transport and storage infrastructure across more tonnes of carbon dioxide can reduce costs for the entire CCUS value chain.

Sharing transportation and storage infrastructure run by an emerging ecosystem of carbon dioxide management companies helps to accelerate and scale up development.

This in turn helps support the decarbonization efforts of industrial companies – and entire industrial regions.

Based on current plans there are about 100 CCUS hubs¹ in development globally. These CCUS hubs could store an average of between 7.5-10 million tonnes of CO₂ a year each by 2030. This could total as much as 1 gigatonne of CO₂ in 2030.²

This is equivalent to shutting down almost 270 coal power plants or removing the emissions of 223 million gasoline-fueled cars.³

CCUS hubs can also add value by sustaining employment in traditional industries such as steel and cement as well as creating jobs in new low-carbon

¹ According to the [IEA's CCUS Projects Explorer](#)

² Based on reported CCUS projects which average 7.5-10 mt each. See [CCUS Hub](#).

³ Calculated using the [US EPA GHG equivalencies calculator](#)

technologies and services, sustaining economic activity for these regions.

OGCI has played a vital role in demonstrating the value of CCUS as a key contributor to global efforts to reduce carbon dioxide emissions.

This, and our close work with national and regional stakeholders, including industry, NGOs and investors, has helped accelerate the development of CCUS hubs.

Kickstarting CCUS

OGCI member companies are now actively involved in developing 40 large-scale CCUS hubs around the world – up from less than five in 2019.

This is a significant percentage of the well over 100 CCUS hubs the IEA says are proposed or in development around the world⁴ – three times as many as in 2021.

The hubs OGCI members are involved in have the potential to remove around 300 million tonnes of CO₂ a year by 2030⁵, equivalent to shutting down 80 coal power plants or removing the emissions of around 67 million cars.⁶

Oil and gas companies have the core skills to successfully develop and operate CCUS hubs, stemming from experience executing complex projects, a deep understanding of the subsurface, and a long history of driving technological innovation.

In recent years, many oil and gas companies have worked on different elements of carbon capture and storage technologies – from retrofitting capture units to carbon dioxide streams in industrial and chemical processes to injecting carbon dioxide into depleting reservoirs and saline aquifers.

OGCI's activities were designed to build on this foundation.



CCUS hubs with OGCI member company participation



⁴ According to the [IEA's CCUS Projects Explorer](#)

⁵ Based on reported CCUS projects which average 7.5-10 mt each. See [CCUS Hub](#).

⁶ According to the [IEA's CCUS Projects Explorer](#)



The first investment made by OGCI's Climate Investment fund laid the groundwork for what would later become known as Net Zero Teesside, a commercial-scale CCUS hub designed to decarbonize industrial and power emitters in Northern England.

Now part of the UK's East Coast Cluster and recently selected as one of the UK government's fast track projects, the hub is on track to store approximately 20 million tonnes of CO₂ a year by 2030 – a significant achievement for a project that started out as an academic concept.

The hub is anchored by the world's first commercial scale gas-fired power station with carbon capture. OGCI and a dedicated team of engineers and project specialists from six of our member companies, were instrumental in the development of this project.

We helped to advise and build on collaboration between the UK government and a broad swath

of industry stakeholders to develop new business models, manage risk, and explore ways to make CCUS more affordable.

This work helped to define policy to support capture in power, industry, hydrogen and biomass, and clarify regulations around storage infrastructure.

It ultimately culminated in a UK government-led task force highlighting in 2018 the significant value that CCUS hubs can bring to spur regional economic activity and job creation, and decarbonize industry to help meet national climate goals.⁷

That support, along with the presence of operators willing to invest long term, attracted interest from potential emitters who wanted to join the hub.

Momentum continues to grow in the UK as more emitters and investors look to engage in the country's ambitious CCUS hub strategy.

OGCI's efforts to kickstart a CCUS industry include:

- **Identifying policy mechanisms and frameworks** that support new business models for emitters to capture their emissions and hub operators to create the infrastructure to transport and store them permanently.
- **Working with governments, academia and industry** in countries with an interest in leveraging CCUS hubs to produce in-depth reports that provide a pathway for CCUS hub development.⁸
- **Developing methodologies** to quantify the availability and maturity of carbon storage resources around the world.⁹
- **Publishing an annually updated CO₂ Storage Resource Catalogue** that currently assesses commercial availability in some 30 countries – providing assurance to companies, regulators, financial institutions and others wanting to make investments in CCUS projects.
- **Creating an interactive global hub search tool** to identify potentially viable hubs around the world, looking at storage options, concentrations of emitters, transport options and costs.
- **Sharing knowledge and expertise** developed by the first pioneering hubs through an online playbook, to help stakeholders work through the complexities of setting up a CCUS hub and running webinars with experts.

[Go to OGCI CCUS hub →](#)

⁷ Source: UK Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy's "[Delivering clean growth: CCUS Cost Challenge Taskforce report](#)" (July 2018)

⁸ OGCI [published a report](#) on CCUS deployment challenges and opportunities for the GCC in March 2022 and [a report on CCUS in China](#) in September 2021

⁹ [OGCI CO₂ Storage Resource Catalogue](#)



Progress in 2023

CCUS Hub Playbook update

This year, we updated the [CCUS Hub Playbook](#), a step-by-step guide for regulators, emitters and CO₂ transport and storage operators seeking to decarbonize industry at scale.

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

The playbook is now available online in 11 languages - Arabic, Chinese, French, Hindi, Indonesian, Italian, Japanese, Portuguese, Russian, Spanish and English.

Technical lessons

We're currently working on a new section on the CCUS Hub platform for technical experts that is designed to help accelerate the pace of CCUS by sharing relevant experience from early movers.

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

This is based on detailed technical material. The first material covered is from Net Zero Teesside and focuses on storage issues and the technology development required for scale up.

Additional material is based on other CCUS hubs, some of which are in development.

The U in CCUS

OGCI is publishing a study on the potential for utilizing captured carbon dioxide as a climate mitigation tool. It includes an analysis of the value of using carbon dioxide in the construction industry as a way to cure cement and as a feedstock to produce fuels.

Region and country reports

Forthcoming reports will focus on the potential for CCUS hubs in Egypt, India, Asia-Pacific and Brazil.

The report on Brazil aims to research and evaluate the potential opportunities and challenges of developing a major CCUS hub in South America.

Opportunities in Brazil



- Decarbonizing Brazil's iron, steel and ethanol industries could help these sectors retain and increase global market share.
- The study suggests that CCUS hubs could spur billions of dollars in GDP growth and help create thousands of new jobs.
- Data points to a number of locations where a significant amount of CO₂ could be stored, including two potential off-shore reservoirs in the southeast.
- Brazil can look to overseas models for policy frameworks that foster CCUS development, including via tax and fiscal policy and R&D support.

Calculating the value of CCUS

OGCI is creating an interactive tool to calculate the value of CCUS in terms of jobs and gross value added in specific regions. The tool is based on a methodology developed by Imperial College London.

It will initially cover regions in the UK, using up-to-date economic data and filtered by industry and capture technology used.

The aim is to develop a standardized methodology that can be used globally across the entire capture, transport and storage value chain to demonstrate the benefits of CCUS projects to local communities.

This can help companies engage with their stakeholders and policy makers potentially enabling the acceleration of projects.



Net zero solutions

Office buildings in London.
Credit iStock, Chunyip Wong



Net zero solutions

Since its launch, OGCI has focused on building and strengthening the foundations to enable the deep decarbonization required to ensure a smooth energy transition that supports net zero.

This applies to our members' operations and more broadly across the oil and gas industry as well as in other energy-intensive sectors.

Cutting emissions means transforming the way energy is produced and consumed and calls for many different solutions and low-carbon technologies. There is no single solution.

Alongside our work to reduce methane emissions and scale up CCUS, we have also worked on a range

of solutions to decarbonize other sectors so we can achieve net zero. These include:

- Providing practical, actionable analysis that is underpinned by data to help **decarbonize oil and gas operations**, starting with our members but extending to our operating partners and the industry at large.
- Finding solutions to **decarbonize transport**, leveraging our members' extensive expertise producing and supplying reliable transport fuels, and work on using mobile carbon capture for shipping.
- Finally, we have worked on the important role that **natural climate solutions** could play to complement decarbonization of the energy sector.

Decarbonizing oil and gas operations

Decarbonizing oil and gas operations will be critical to meeting the Paris Agreement goals. Scope 1 and 2 emissions from oil and gas operations were estimated to total just over 5 gigatonnes of CO₂e in 2021.¹

That is 15%¹ of total energy-related emissions and 9%² of global greenhouse gas emissions. The right regulatory and policy support and incentives would help efforts to reduce these emissions.

A recent study from OGCI's Energy Efficiency workstream has shown that it is possible to decarbonize the majority of Scope 1 and 2 emissions in refineries by using electricity generated from low-carbon sources to power some equipment instead of fossil fuels.

The study, conducted by global consultancy and engineering company Wood Plc., found that using electric boilers and electric drives for condensing turbines should be prioritized as they are proven technologies and have marginal abatement costs under \$150 per tonne of CO₂.

The primary roadmap which reduces over 65% of a refinery's CO₂ could be achieved by 2040 if there is sufficient availability of low-carbon power, the study found.

"Decarbonizing the refining sector, which emits around 1 gigatonne of CO₂e a year, will play an important role in achieving a net zero emissions future and our latest study on the refinery sector sets out pathways to support that goal."

Justine Roure, OGCI Deputy Vice President Strategy & Policy



¹ As per International Energy Agency and European Commission EDGAR (Emissions Database for Global Atmospheric Research)

² IPCC Sixth Assessment Report



Decarbonizing transport

Decarbonizing transport is critical to all pathways to get to net zero.

The transport sector emits almost a quarter of total energy-related carbon dioxide emissions.

While the passenger vehicle sector is already transitioning toward electric power, electrification is not so straightforward for heavy duty long-haul trucking, deep-sea marine vessels and long-distance aviation.

A key inhibitor to electrifying these sectors is the size and weight of the batteries required to store the electric energy required.

OGCI has focused decarbonization efforts on areas where our members already have extensive expertise – producing and supplying reliable lower carbon liquid and gaseous fuels for transport and developing mobile applications of carbon capture and storage for shipping.

To build a foundation, we have worked on a ground-up examination of the opportunities and challenges of scaling up key low-carbon liquid fuels that can be used in existing engines, such as biofuels, methanol and ammonia, and synthetic fuels, either on their own or blended.

We have also studied the use of hydrogen for transport.

These studies have worked to understand the fuels, the potential market size, sustainability, safety measures and infrastructure that would be required.

Low-carbon fuels and hydrogen



Biofuels

Can be used in any vehicle



Hydrogen

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



Ammonia and methanol

Can be used in shipping



E-fuels (synthetic fuels)

Can be used in any vehicle

Progress in 2023

In 2023, we began to investigate practical steps on how the industry can meet future demand for these fuels.

On the supply side, we are working on a plan to create a set of standards for potential refinery feedstocks – known as renewable crudes – that will be used to make some of the low-carbon fuels.

This will enable refiners to understand the feedstock they receive, allowing them to appropriately manage the refining process at their facilities.

This work would eventually help facilitate discussions with standard setting organizations, such as the International Standards Organization or ASTM, to help drive the development and scale up of a renewable crude market.



Currently, there is a lot of variability around renewable crudes and that complicates processing and refining, potentially curbing a faster scale up of the market.

On the demand side, we are evaluating what the transport sector fuels market will look like in 2050 in specific regions under current policies for a net zero scenario.

The forecasts we are developing will aid the industry's understanding of what and where the opportunities will be for low-carbon fuels.

Early results from a forthcoming study of the EU market show that under current policy and carbon price expectations, demand for low-carbon fuels and hydrogen is expected to be significant in 2050. We have now extended this analysis to transport markets in the US, China and Brazil.

What are renewable crudes?



- Renewable crudes are made from a variety of feedstocks and processes
- Examples include biofuel feedstocks upgraded by pyrolysis or hydrothermal liquefaction and e-crudes (synthetic fuels)
- Renewable crudes can be considered as analogues to fossil crudes allowing some of them to use the same infrastructure
- They can be used to help decarbonize the transport sector

Decarbonizing shipping

Decarbonizing shipping fits in with our strategy to use our expertise and technology to help other sectors and industries decarbonize.

Like many other sectors and industries, decarbonization here will require a range of solutions.

In this area, our work has focused on where we can add value by leveraging our members' extensive expertise producing and supplying reliable transport fuels. So we have been supporting the development of low-carbon fuels, such as biofuels, ammonia and methanol for shipping.

We have begun work on a study of the percentage of specific low-carbon fuels that could be blended into the heavy fuels used in the marine market to reduce carbon intensity in existing vessels.

Initial investigations look positive but further laboratory investigation would be required to validate findings.

Until greater supplies of low carbon fuels are available, parts of the transportation network would need other options to decarbonize. We also studied the feasibility of using carbon capture technologies on board a vessel.

Carbon capture and storage has long been a priority for OGCI and our member companies have significant experience applying this technology.

In 2019, we partnered with tanker shipping company Stena Bulk to launch a feasibility study with The Netherlands Organization for Applied Scientific Research. Other consortium members, including the Global Centre for Maritime Decarbonisation, heavy industry supplier Alfa Laval and others, joined our efforts in 2021 to explore the installation of a carbon capture system on board a medium range tanker.

Helping to reduce the carbon intensity from the use of oil and chemical tankers to distribute products around the world is a way to help some of our members reduce a portion of their Scope 1 and 2 emissions from shipping.



Natural climate solutions

The energy sector must be decarbonized to meet net zero. Emissions reductions remain the priority for the oil and gas industry and our member companies continue their focus on avoiding, minimizing and reducing greenhouse gas emissions.

OGCI supports policies, national strategies and initiatives that aim to scale up the use of high-quality natural climate solutions and we focus on initiatives that help ensure that natural climate solutions are used responsibly.³

However, not all emissions can be abated, and that is where natural climate solutions – or NCS – can play a complementary role now and in the future.



Value of natural climate solutions

- UN IPCC net zero scenarios that include NCS show the transition for society could be quicker and cost less⁴
- NCS include the conservation, restoration and sustainable use of forests, grasslands, coastal vegetation, agricultural soils, wetlands, and other ecosystems in ways that mitigate climate change and enhance climate resilience⁵
- NCS has many potential benefits, including helping to protect communities' resilience to climate impacts, economic growth and diversification, improvement of human health and livelihood and protection of biodiversity and water resources

OGCI's NCS initiatives include:

- Working with Ipieca to **update guidelines and best practice**⁶ for the oil and gas industry to help companies preserve and restore natural carbon sinks as a result of operations and development.
- Supporting the NCS Alliance's work to develop **a procurement guide for buyers.**
- Early-stage work to identify and scale up potential technologies to monitor, report and verify emissions reductions from NCS to **ensure transparency.**

³ OGCI position paper on natural climate solutions

⁴ Source: Intergovernmental Panel on Climate Change, Global Warming of 1.5 °C, 2018.

⁵ Natural Climate Solutions: high carbon stock ecosystems management guidance

⁶ Natural Climate Solutions: high carbon stock ecosystems management guidance

OGCI performance data 2022



Industrial engineers working on design models. Credit Adobe Stock.



OGCI has been collecting aggregate data across all member companies since 2017.

In line with best practice, we are continually improving data collection methodologies and processes in areas such as flaring, investment and research and development (R&D) in low-carbon technologies as well as adding new aggregate indicators as they become relevant.

This year, for the first time, we are publishing greenhouse gas emissions data on an equity basis to complement operated data. Eleven of our 12 companies reported data for Scope 1 and 2 equity greenhouse gas emissions – one more than last year, which was the first year we collected the data.

EY, an independent third party, collects and reviews OGCI data.

In 2023, EY issued a limited assurance statement, as it has done in previous years. This year the EY statement covers nine companies' data for 2022 ([see statement page 29](#)). This year, EY increased the requirements for assurance in line with evolving auditing standards.

Abbreviations

Mboe/day

Million barrels of oil equivalent per day

kgCO₂e/boe

Kilograms of carbon dioxide equivalent per barrels of oil equivalent

MtCO₂e

Million tonnes of carbon dioxide equivalent

MtCH₄

Million tonnes of methane

Mm³

Million cubic metres

All reported data is the aggregate for 12 companies unless otherwise stated.

Note: Our member companies are continually improving their own reporting methodologies. As a result, the published data for 2020 and 2021 incorporates some methodological changes and may differ slightly from those previously reported. Read more about OGCI's definitions and methodology in the OGCI Reporting Framework

With six years of aggregated operated data now available, we can see some clear trends across our members:

1. **Greenhouse gas emissions are continuing to decrease and OGCI members are on track to achieve the group's collective 2025 upstream carbon intensity target.**

Aggregated upstream carbon intensity at operated assets is 21% lower than it was in 2017, largely due to reductions in methane and flaring emissions and an increase in renewable sourcing and portfolio changes.

2. **Investment in low carbon technologies, including acquisitions and R&D, has risen steadily since 2017 and was up 66% in 2022 vs 2021.**

In 2022, OGCI member companies invested \$24.3 billion on low-carbon technologies – almost 70% more than spending in the previous year.

Renewable energy technologies such as wind and solar accounted for the largest share, while spending on carbon capture, utilization and storage tripled since 2021.

Since 2017, OGCI members have cumulatively spent \$65 billion on low carbon technologies (including acquisitions and R&D).

3. **Since 2017, operated absolute upstream methane emissions and flared volumes have halved.**

The volume of methane emissions reductions across all relevant operated sectors since 2017 is 1.1 million tonnes of methane. This is equivalent to removing the emissions of almost 7 million gasoline-powered passenger vehicles for one year.¹

This progress supports OGCI member companies aim to reach near zero methane emissions by 2030 from operated oil and gas assets in line with the Aiming for Zero Methane Emissions initiative OGCI launched in 2022.

¹ Calculated using the [US EPA GHG equivalencies calculator](#)



PRODUCTION

Aggregate operated oil and gas production from the 12 OGCI member companies remained steady in 2022 at 43.9 Mboe/day. Oil production rose 2% compared with the previous year, while gas production fell 1%. Production trends across the companies were mixed.

In 2022, oil production was overall slightly higher on the year as decreased output at most of the companies was offset by an increase at the remainder

amid disruptions to global energy markets following Russia's invasion of Ukraine. Gas production decreased slightly as some companies divested assets.

Since 2017, oil production has fallen 5% while gas production has risen 2%. The share of gas has now risen to 35.3% of aggregate operated oil and gas production. OGCI member companies operated 27% of global oil and gas production in 2022².

OGCI indicators	Unit	2017	2018	2019	2020 ¹	2021 ¹	2022
OGCI oil production (operated)	Mboe/day	29.8	29.9	29.7	28.4	27.9	28.4
OGCI gas production (operated)	Mboe/day	15.2	15.7	16.1	15.1	15.6	15.5
OGCI oil and gas production (operated)	Mboe/day	45.0	45.6	45.8	43.5	43.5	43.9
Share of natural gas in OGCI operated portfolio	%	33.8	34.3	35.2	34.7	35.9	35.3
OGCI oil and gas production (equity)	Mboe/day	42.5	42.4	42.9	41.6	41.1	41.7

Notes:

¹ 2020 and 2021 data restated

GREENHOUSE GAS EMISSIONS (operated)

Upstream carbon intensity is on track to achieve OGCI's 2025 target of 17 kg/boe. In 2022, it fell to 18 kg/boe, a 6% decrease compared to the previous year. This brings the total reduction in carbon intensity since 2017 to 21%.

Reductions in absolute greenhouse gas emissions at operated assets fell by 5% in 2022 in line with the reduction in upstream carbon intensity.

Scope 1 upstream greenhouse gas emissions fell by 5% over the year (and a total of 22% since 2017), due to factors including a reduction in flaring, vent recovery projects and portfolio changes.

Scope 2 upstream greenhouse gas emissions fell by 5% over the year (and a total of 12% since 2017), mainly due to an increase in renewable sourcing and divestments.

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 decarbonization efforts in refineries and chemical facilities.

In 2022, OGCI members' aggregate greenhouse gas emissions (Scope 1 operated) including upstream and downstream was 590 MtCO₂e. This represents 1.1% of global greenhouse gas emissions, using latest 2021 data from UNEP'S Emissions Gap Report for 2022.³

² Provisional estimate of global oil and gas production of roughly 162 Mboe/day in 2022, based on IEA indicators for oil supply of 94.8 Mboe/day and global natural gas production of 67.3 Mboe/day. OGCI member companies' share of total oil and gas production is 27% on an operated basis and 26% on an equity basis. [IEA Oil Market Report \(January 2023\)](#); [IEA 2023 Gas Market Report Q1](#)

³ [UNEP'S Emissions Gap Report 2022](#), p34. The 2021 data for total GHG emissions excluding LULUCF is 52.8GtCO₂e



OGCI indicators	Unit	2017	2018	2019	2020 ^v	2021 ^v	2022
Upstream carbon intensity ⁱ	kgCO ₂ e/boe	22.7	22.1	21.3	20.4	19.1	18.0
Operated greenhouse gas emissions – all sectors (Scope 1) ⁱⁱ	MtCO ₂ e	709	687	684	633	620	590
of which: upstream emissions (Scope 1) ⁱⁱⁱ	MtCO ₂ e	362	349	343	311	296	282
Upstream greenhouse gas emissions (Scope 2) ^{iv}	MtCO ₂ e	41.4	43.5	43.7	39.4	38.2	36.4

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 CO₂ 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 MtCO₂e in 2022.
- 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 2020 and 2021 data restated for "upstream carbon intensity", "operated greenhouse gas emissions - all sectors (Scope 1)" and "of which: upstream emissions (Scope 1)".

GREENHOUSE GAS EMISSIONS (equity)

This year we started publishing equity emissions for the first time, marking an important milestone in OGCI's reporting and reflecting the group's strategy to lead the industry toward greater transparency.

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

Total greenhouse gas emissions on an equity basis for Scope 1 and Scope 2 were 595.7 MtCO₂e and 83 MtCO₂e respectively in 2022. This is 6% and 20% higher respectively than the previous year as more

companies (11 versus 10) reported data for 2022 than in 2021 – the first year we started to collect this data.

Comparing the same group of 10 companies that reported in 2021, Scope 1 equity emissions fell by 4%. Scope 2 equity emissions fell by 3% as some companies switched to renewable electricity.

Absolute methane emissions on an equity basis were 0.9 Mt of methane in 2022, a 16% decrease compared with the previous year, mainly driven by emissions reductions upstream.

OGCI indicators	Unit	2017	2018	2019	2020	2021 ⁱ	2022
Equity GHG emissions - Scope 1	MtCO ₂ e	–	–	–	–	560.9 (10)	595.7 (11)
Equity GHG emissions - Scope 2	MtCO ₂ e	–	–	–	–	69.1 (10)	83.0 (11)
Total equity CH ₄ emissions	MtCH ₄	–	–	–	–	1.1 (9)	0.9 (9)
Equity upstream CH ₄ emissions	MtCH ₄	–	–	–	–	1.09 (10)	0.90 (10)

Notes:

- I 2021 data restated.



METHANE EMISSIONS (operated)

OGCI members reported an aggregate upstream operated methane intensity of 0.15% in 2022, a 17% decrease over the year and half the level seen in 2017. OGCI members had already achieved their collective methane intensity target of well below 0.2% in 2021 – four years early.

Absolute upstream methane emissions decreased by 17% in 2022 compared with 2021 and 50% since 2017. The reduction is mainly a result of widescale 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 93.7% of OGCI total methane emissions in 2022. Venting and fugitive leaks accounted for over 66.7% of total upstream methane emissions.

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

OGCI indicators	Unit	2017	2018	2019	2020 ^{III}	2021 ^{III}	2022
Upstream methane intensity ^I	%	0.30	0.25	0.23	0.21	0.18	0.15
Operated methane emissions – upstream	MtCH ₄	2.0	1.7	1.6	1.3	1.2	1.0
Operated methane emissions – all sectors ^{II}	MtCH ₄	2.1	1.9	1.7	1.4	1.3	1.0

Notes:

- I This is the key performance indicator for OGCI's 2025 upstream methane target of well below 0.2%. 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 2020 and 2021 data restated.

FLARING (operated)

OGCI member companies continued to reduce flaring volumes and related greenhouse gas emissions from flaring in 2022, in line with their commitment to end upstream routine flaring and achieve near zero methane emissions by 2030.

In 2022, upstream flaring intensity fell by 21% on the year, accompanying an 18% reduction in upstream flaring emissions.

Routine flaring volumes in upstream fell in 2022 compared with the previous year as one less company reported data.

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

Since 2017, upstream flaring of greenhouse gas emissions have decreased by 45%.



OGCI indicators	Unit	2017	2018	2019	2020 ^{II}	2021 ^{III}	2022
(number of companies)							
Upstream flaring intensity ^I	Mm3/Mtoe	10.8	9.5	9.2	7.6	7.4	5.8
Natural gas flared – upstream	Mm3	24,221	21,465	20,998	16,490	15,931	12,714
Routine gas flared – upstream	Mm3	-	5,636 (10)	4,871 (10)	4,250 (11)	4,165 (12)	2,923 (11)
Flaring greenhouse gas emissions – upstream	MtCO ₂ e	62	57	55	44	42	34

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 2020 data restated for "upstream flaring intensity" and "natural gas flared - upstream."

III 2021 data restated.

INVESTMENT AND R&D IN LOW CARBON TECHNOLOGIES

Aggregate OGCI data on low-carbon investment, including acquisitions and R&D includes between nine and 11 companies. These companies reported investments totalling \$24.3 billion in 2022, an increase of 66% compared with 2021.

Renewable energy accounted for more than half of the low-carbon investment and comprised the bulk of the acquisition spend. Organic investment in CCUS almost tripled over the year, with most OGCI

members investing in the technology as part of their decarbonization strategies.

R&D spending on low carbon technologies continued to grow in 2022 with a 38% increase in absolute terms over the year and accounting for 32% of total R&D spend – double the share in 2021.

The total spend on low carbon technologies and projects, including investment, R&D and acquisitions, amounted to \$65 billion since 2017.

OGCI indicators	Unit	2017	2018	2019	2020 ^{III}	2021 ^{IV}	2022
(number of companies)							
Investment in low carbon technologies ^I	US\$ billion	4.7 (10)	5.5 (10)	5.6 (10)	6.8 (11)	13.3 (11)	22.5 (11)
of which: acquisitions	US\$ billion	0.3 (5)	1.0 (5)	1.1 (9)	1.6 (9)	7.7 (9)	13.1 (9)
R&D expenditures on low carbon technologies ^{II}	US\$ billion	0.7 (9)	1.0 (9)	1.0 (9)	0.8 (11)	1.3 (11)	1.8 (11)
Low-carbon R&D as a share of total R&D spend	%	19.0 (9)	15.0 (9)	15.0 (9)	11.7 (11)	17.3 (11)	32.0 (11)

Notes:

I 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.

II R&D spending is additional to investment.

III 2020 data restated for "investment in low carbon technologies" restated.

IV 2021 data restated for "investment in low carbon technologies" and "low-carbon R&D as share of total R&D spend."



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.

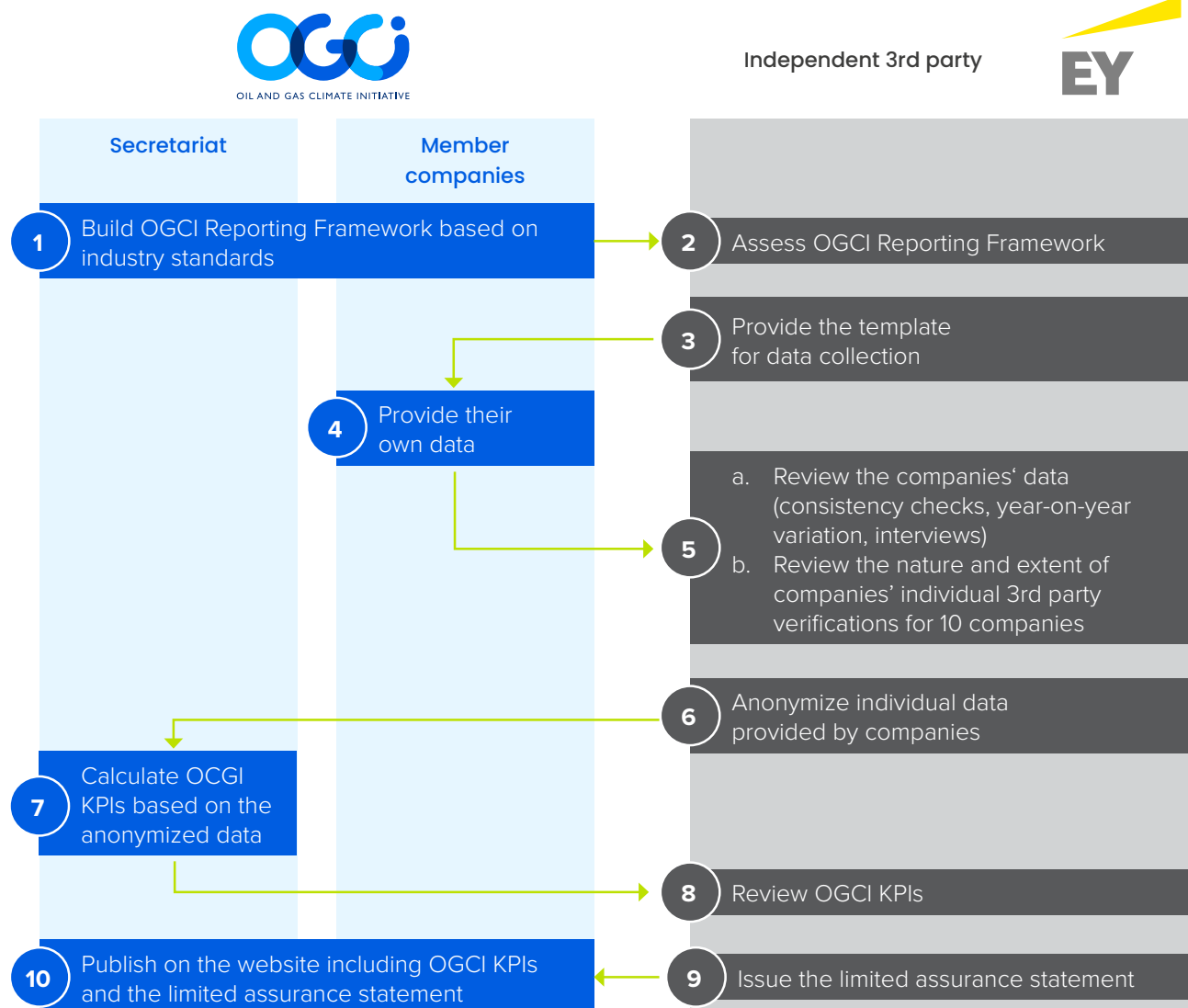
Most OGCI member companies already ensure that data reported to OGCI are independently verified.

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, 2022

Further to OGCI Climate Investment LLP's request, on behalf of OGCI, and in our capacity as independent verifier, member of the EY network, statutory auditor of OGCI Climate Investment LLP, we hereby present our report on a selection of OGCI indicators (the "OGCI Indicators") for the year ended December 31, 2022 detailed in Appendix 1, that OGCI has selected, prepared and presented on its website.

Qualification

We had access to the nature and extent of third-party verifications conducted at company level on member-company data for only 9 companies out of the 12 OGCI member companies (representing 55% of the "Total Operated greenhouse gas emissions – Scope 1" OGCI Indicators).

Comments

Member companies align their reported data with local methodologies required by local authorities, that may vary depending on geographies.

For methane emission quantification and operated scope 2 greenhouse gas emissions, companies are using different tiered approaches.

Conclusion

Based on our work, described in the "Nature and scope of work" section of this report, except for the matters described above, nothing has come to our attention that causes us to believe that the OGCI Indicators are not presented in accordance with version 3.7 of the OGCI Reporting Framework dated March 2023, in all material respects.

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 version 3.7 of the OGCI Reporting Framework dated March 2023, 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 dated March 2023, 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 dated March 2023 and to disclose to EY the nature and details of the verification performed on their data at member-company level.



Independence and quality control

Our independence is defined by the Code of Ethics of our profession. In addition, we have implemented a quality control system, including documented policies and procedures to ensure compliance with ethical standards, professional standards and applicable laws and regulations.

Responsibility of the independent verifier

It is our responsibility, in response to OGCI's request, based on our work, to express a limited assurance conclusion on whether the OGCI Indicators have been calculated in accordance with the OGCI Reporting Framework dated March 2023.

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

We conducted the work described below in accordance with international standard ISAE 3000 (International Standard on Assurance Engagements) and with professional standards applicable in France.

- We assessed the suitability of the OGCI Reporting Framework dated March 2023 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 the 12 OGCI member companies with the OGCI Reporting Framework dated March 2023:
 - assessment of the appropriate application of the OGCI Reporting Framework dated March 2023 to the member-company data;
 - analysis and investigation of member-company data value change in 2022 compared to 2021;
 - 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:
 - work program;
 - assurance standard;
 - number of man days;
 - physical site visits;
 - remote site visits;
 - scope 1 operated emissions coverage reached with site level verifications;
 - audit findings;
 - third party team members' competencies.
- We conducted interviews with the 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, September 22, 2023

EY & Associés
Partner, Sustainable Development

Christophe Schmeitzky



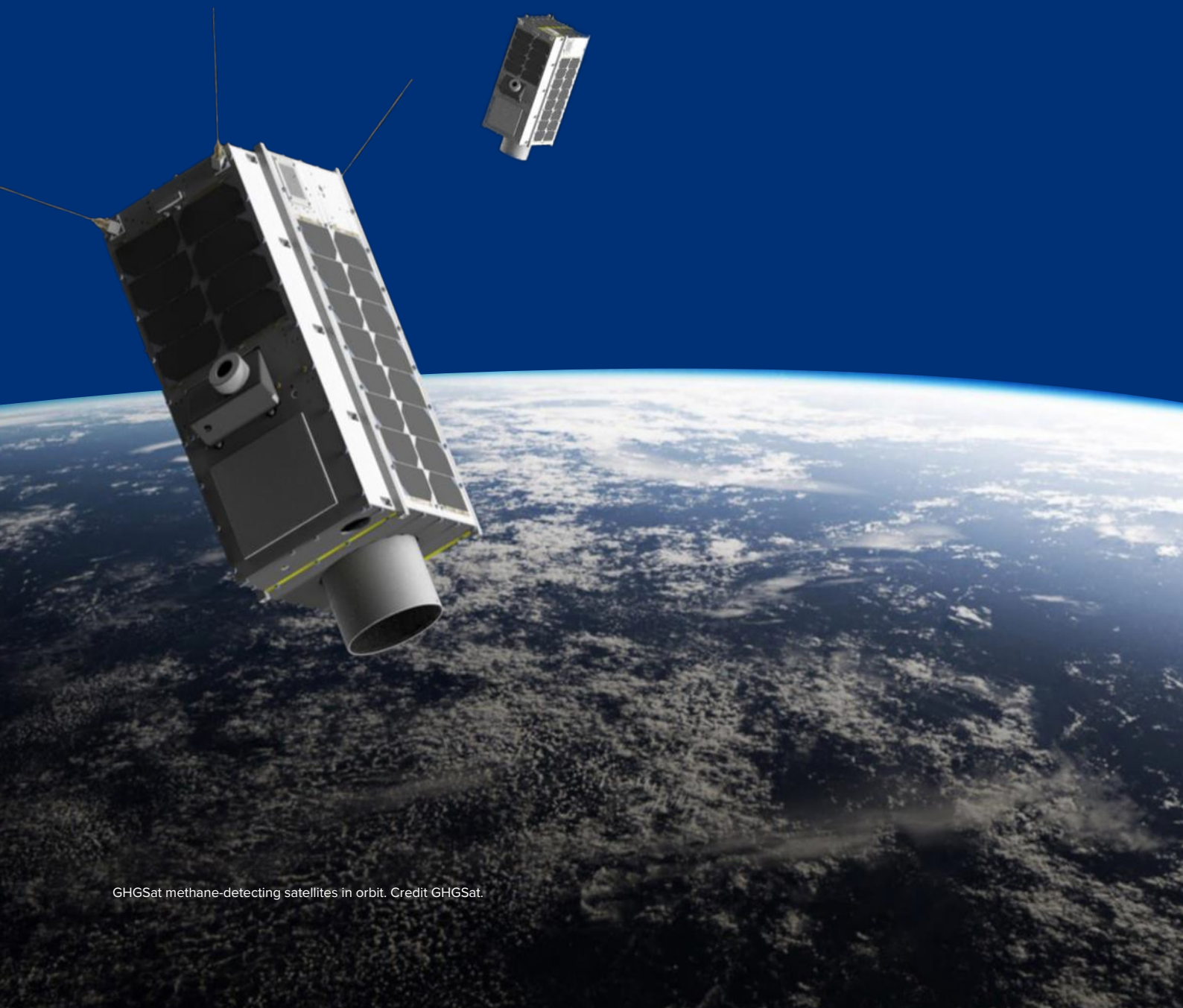
Percentage of OGCI Indicators considered as reviewed by an external third party and for which the third-party verification work has been shared with EY

OGCI indicators	Percentage of 2022 OGCI Indicators considered reviewed ^I by an external third-party	Percentage of 2022 OGCI indicators for which the third-party verification work has been shared with EY
Operated greenhouse gas emissions – all sectors (Scope 1)	84%	55%
Operated greenhouse gas emissions – upstream (Scope 1) ^{II}	86%	62%
Operated greenhouse gas emissions – upstream (Scope 2) ^{II}	95%	41%
Operated methane emissions ^{III} – all sectors		
- verified as part of operated greenhouse gas emissions – scope 1	86%	40%
- verified as a standalone indicator	11%	8%
Operated methane emissions – upstream ^{III}		
- verified as part of total operated GHG emissions – scope 1	86%	40%
- verified as a standalone indicator	19%	19%
Natural gas flared – upstream ^{IV}	83%	72%
Flaring greenhouse gas emissions – upstream ^{IV}	81%	70%

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 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.

Climate Investment



GHGSat methane-detecting satellites in orbit. Credit GHGSat.

Investing in innovation and partnerships to drive impact

Climate Investment (CI) is an independently managed, specialist decarbonization investor founded by members of the OGCI. Our mission is to drive near-term greenhouse gas emissions reduction through investment and market adoption of our portfolio company innovations across our network of investors and global partnerships.

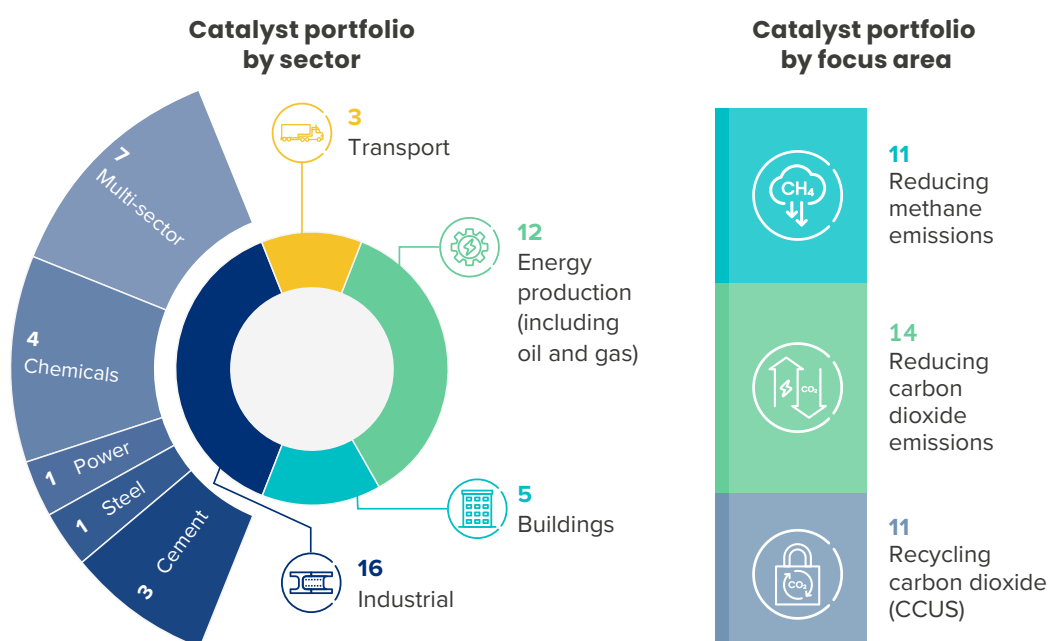
Over the past six years, we have built a portfolio of 36 companies with innovative products and services, operating in the energy, transportation, built environment and industry sectors. The portfolio delivered 27.4 million tonnes (Mt) CO₂e of impact in 2022, greater than the avoided emissions from the entirety of the onshore wind capacity added in the US in 2021 (13 GW) operating for one full year¹, and since 2019, has delivered 57 Mt of CO₂e of GHG impact².

Achieving high levels of impact requires a differentiated approach and providing capital investment alone is not enough. The climate problem requires a “systems” approach as there are no silver bullets; innovations will need to be embedded in existing physical and human processes, all of which require knowledge and time.

This is why CI stands out as a truly differentiated investor. Our team has over 200 years of investing experience, coupled with over 380 years of technology development and deployment across the different sectors we invest in³. Together, we curate disruptive, transformative technologies, and advance market opportunities for them with our investors. Those partnerships are driving the decarbonization results we are seeing in our portfolio.

Investors recognize our approach is tangibly differentiated, focused on enabling them to decarbonize their businesses and support delivery of their impact goals. Innovators recognize that our model is designed to mobilize their technologies’ adoption and maximize their impact.

The CI team has facilitated over 135 deployments and commercial contracts between our portfolio companies and investors. These partnerships validate those portfolio companies’ technologies, establish their market credibility and cultivate their adoption, accelerating impact results. In turn, adoption costs fall and cost-effective global markets open up for decarbonization products and services.



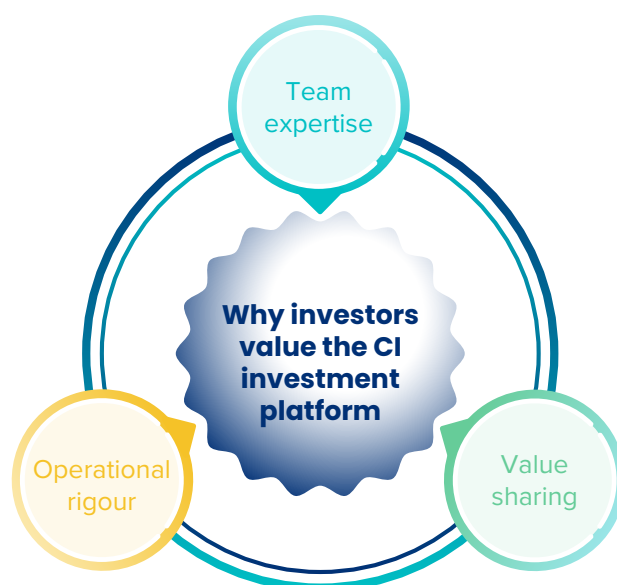
¹ Calculated by inputting the portfolio impact figures into the EPA's GHG Equivalency Calculator

² We define GHG impact as GHG avoided, reduced, stored or recycled

³ CI internal data as of September 2023. Please note that years of experience across different sectors and functions may overlap.

Why investors value the CI investment platform

What we offer is hard for other funds to replicate.



Team expertise

Investors and portfolio companies benefit from our team's breadth of technology, industrial and investment skills and expertise. With years of experience and embedded relationships across both the impact-focused investment community and corporate operations, our team is valued for its vision and technical acumen, as well as for the commercial opportunities it initiates.

Value sharing

The partnerships we help create accelerate impact and help our portfolio companies develop into commercially sustainable and successful enterprises whose solutions can be adopted widely and drive business change at scale. Our investors gain both commercial and investment exposure to these companies, often choosing to co-invest on our deals and participate in portfolio companies' future funding rounds. As CI investors, they are offered regular opportunities to contribute their expertise and benefit from bilateral exchanges with other investors, gaining insights that they can integrate within their own businesses.

Operational rigour

Impact quantification is fundamental to ensuring our portfolio is delivering the GHG impact we expect. We have prioritized the operational implementation of our methodology, deploying it consistently across our portfolio and ensuring it is independently assessed. Our transparent and robust approach provides confidence. It is applied from deal evaluation to exit and our portfolio companies trust and incorporate it within their businesses. This helps them to attract both investment and customers.

"Achieving high levels of GHG reduction quickly requires more than just capital. It needs a dedicated team closing market gaps and driving adoption."

Dr Pratima Rangarajan, CEO,
Climate Investment



Portfolio

Our strategy addresses GHG emissions reduction, energy efficiency and carbon capture, recycling and/or storage (CCUS). We champion the development of circular markets, waste reduction, resource conservation and opportunities to create a sustainable decarbonization of the global economy.

Our portfolio construction considers what solutions multi-sector investors will need for their businesses and we take a systems-level approach to it, as we understand that there will be no single solution to energy transition.

Methane Emissions Reduction Portfolio

Since our first investment, significant momentum has built around the need to stem methane emissions. Various initiatives, including the OGCI's Aiming for Zero campaign, the Oil & Gas Methane Partnership 2.0 (OGMP 2.0), and the US Inflation Reduction Act provide the favourable backdrop and the incentive for operators to act. We continue to seek out innovations that can be transformative and to add these to our Methane Portfolio.

The 11 innovations in our methane emissions reduction portfolio span detection, measurement and mitigation. Between January 2022 and August 2023, we added three new investments: F2V⁴, ICA-Finance and SensorUp.

Carbon Dioxide Emissions Reduction Through Energy Efficiency

Energy security and climate collided in 2022, resulting in mixed responses where many stakeholders reined-in climate resolutions while others stepped forward with initiatives that could make a significant dent in demand and CO₂ emissions. We continue to build our promising energy efficiency portfolio of cost-efficient solutions that are also lower in resource utilization and emissions, and which address several high-emitting sectors. Our fourteen energy efficiency technologies optimize operations within factories and plants, commercial and residential buildings, transportation in ships, trucks and in battery technology.

In the period January 2022 to August 2023, we added four new investments: Aeroseal, Fero Labs, Gradient Comfort and Carbon Upcycling Technologies.



⁴ Our investment in F2V applies the principles of carbon utilization to methane emissions from flaring, reusing the methane instead of combusting it.

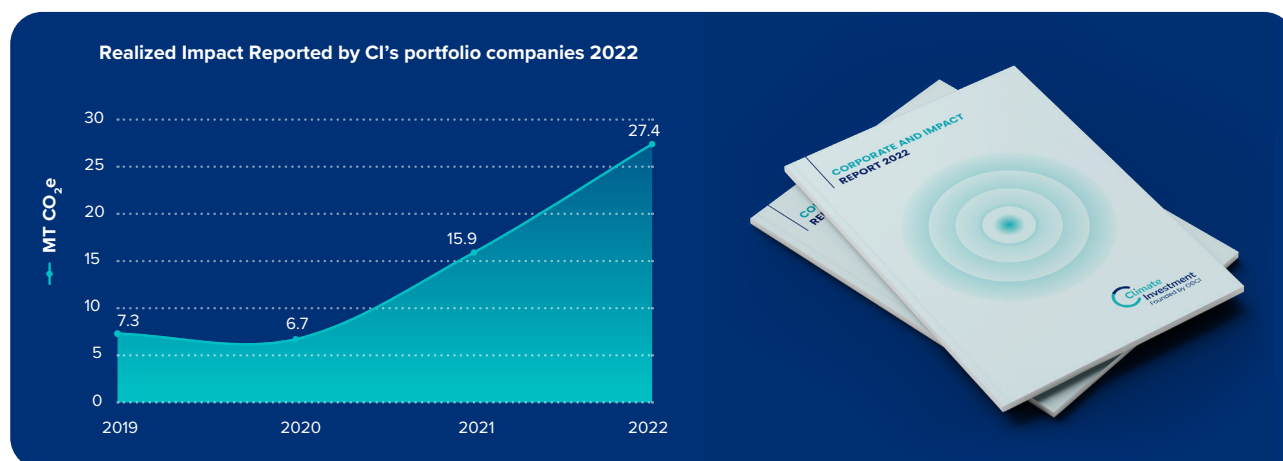
Carbon Capture, Recycling and Storage (CCUS)

The potential of the CCUS market continues to grow, and this potential was enhanced by the US Inflation Reduction Act, the expansion of the EU Emissions Trading Scheme, and strong global carbon prices. However, the CCUS industry is still in its early stages, since the process of securing the requisite permits and building necessary infrastructure remains slow.

Nonetheless, we continue to seek out and execute differentiated opportunities to make new or follow-

on investments. By providing development capital to companies initiating and/or operating CCUS platforms, we catalyze the future business models that can deliver carbon capture, recycling and storage at scale. We have 11 investments in our CCUS portfolio. Between January 2022 and August 2023, we added two new investments to our CCUS Portfolio, Keystate and Trace Carbon Solutions. Additionally, during 2022, policy incentives and a recognition of the importance of CCUS in achieving the energy transition resulted in CI portfolio company, Svante, raising significant capital from its series E round, alongside a successful capital raise from Econic Technologies.

Read about our portfolio of new and existing investments and their impact progress in CI's Corporate & Impact Report 2022



The future

As we look to the next five years, we have initiated a new growth equity investment strategy and intend to raise additional capital for our venture capital Catalyst program. Expanding our coverage through the early to growth stage spectrum provides enhanced opportunities for our investors to incorporate scalable, proven solutions within their businesses.

We are delighted to welcome our new investors. Together, we are driving market adoption, reducing innovation costs, and creating a global market of cost-effective decarbonization solutions. We encourage others to [join us](#) on our mission as we grow and evolve our unique model.



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 to create a US\$1 billion-plus fund that invests in companies, technologies and projects that accelerate decarbonization in energy, industry, built environments and transportation.



Legal disclaimer

While all OGCI member companies have contributed to the development of this report, the views or positions it contains may not fully reflect the views of a particular OGCI member company.

Similarly, this report does not cover all relevant activities of OGCI member companies; nor do all member companies participate in all of the activities described.

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This document contains certain forward-looking statements – that is, statements related to future, not past events and circumstances – which may relate to the ambitions, aims, targets, plans and objectives of OGCI and/or its member companies. These use expressions such as “accelerate”, “advance”, “aim”, “ambition”, “commit”, “expect”, “plans”, “strive”, “target” and “will” or similar expressions intended to identify such forward-looking statements. Forward-looking statements involve risk and uncertainty because they relate to events and depend on circumstances that will or may occur in the future and are outside of the control of OGCI and/or its member companies. Actual results or outcomes may differ from those expressed in such statements, depending on a variety of factors. OGCI does not undertake to publicly update or revise these forward-looking statements, even if experience or future changes make it clear that the projected performance, conditions or events expressed or implied therein will not be realized.