



DELIVERING ON A LOW CARBON FUTURE

A PROGRESS REPORT FROM THE OIL AND GAS CLIMATE INITIATIVE
DECEMBER 2020



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FOREWORD FROM THE CEOS

OGCI's 2020 progress report aims to show how we are fulfilling the pledge we made in our Open Letter in May of this year, to continue urgent and practical action on climate change. Our focus is on action that has real impact now and delivers on decarbonization in the coming decades.

The emissions impact of the global economic downturn caused by the Covid-19 pandemic has demonstrated the difficulty in reducing carbon emissions quickly. A broad and ambitious portfolio of near, mid and long-term low carbon solutions is required. This includes new technologies, business approaches, mindsets and smart regulations.

These solutions can only be implemented with collaboration across industry sectors and value chains, and with governments and society setting a clear collective direction.

FOCUSING ON WHAT MATTERS

It has been a turbulent year for our industry. Our member companies continue to manage the pandemic's impact on our workforces and communities and support the production of masks, gowns and sanitizer that remain crucial to society's response. We have done this while facing challenging market conditions and a global economic recession.

That combination of factors forces us to focus on our core businesses. These have demonstrably come to include contributing to the low carbon transition – which is at the heart of what OGCI does as an organization and is important to us collectively and individually.

OGCI Climate Investments, our US\$1B+ fund, has remained active, growing its portfolio to 19 investments and accelerating the deployment of state-of-the-art technologies. Our member companies are individually leveraging these technologies to facilitate emissions reduction.



Amin Nasser
Saudi Aramco



Michael K. Wirth
Chevron Corporation



Claudio Descalzi
Eni S.p.A.



Bernard Looney
BP Plc



Dai Houliang
CNPC



Anders Opedal
Equinor ASA

We jointly launched a new upstream carbon intensity target in July, and we are well on the way to meeting our collective upstream methane intensity ambition.

Four of our existing CCUS KickStarter hubs are now on track to be operational by 2025 and we have added two new hubs this year. We have also made headway in the transport sector, where we are collaborating with a range of industry partners to demonstrate the potential of low carbon solutions in shipping and aviation.

DELIVERING LOW CARBON SOLUTIONS AT SCALE

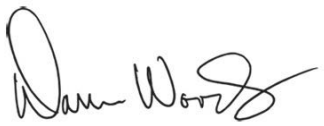
The Covid-19 crisis has made collaborative action both more critical and more difficult this year. It has also reinforced the importance of accelerating our response to climate change, while focusing on sustainable growth.

For our companies and our fund, that means taking further practical steps together now to reduce emissions, while delivering a growing number of low carbon solutions at scale. These will help to transform the energy sector, build the foundations for new ambitious low carbon initiatives and support the aims of the Paris Agreement.

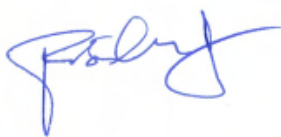
The coming year will be pivotal as momentum increases before the long-awaited COP26 climate conference, to be held in November 2021 in Glasgow. In that spirit, we look forward to working closely within our companies and with our customers, supply chains and other stakeholders to make the low carbon future a reality.



Darren Woods
Exxon Mobil Corporation



Roberto Castello Branco
Petroleo Brasileiro SA



Ben van Beurden
Royal Dutch Shell plc



Vicki Hollub
Occidental



Occidental



Josu Jon Imaz
Repsol S.A.



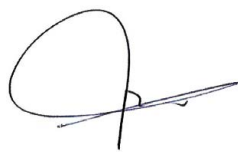
REPSOL



Patrick Pouyanné
Total S.E.



TOTAL



“For OGCI, the strength of the whole is greater than the sum of the parts.”

Bob Dudley – Chairman,
OGCI Steering Committee



OGCI AT A GLANCE

28%

of global oil and
gas production¹

678Mt

greenhouse gas emissions²

\$7.4B

annual spend on low
carbon solutions³

1. DELIVERING ON A LOW CARBON FUTURE

THE POWER OF COLLABORATION

Collective action is OGCI's greatest strength. Through our initiative, 12 major national and international oil and gas companies work towards the common goal of addressing climate change and enabling low carbon solutions.

Collaboration on a global scale is not easy – especially during a global pandemic that has cost lives and jobs, and hit companies hard. This difficult year has, however, reinforced our commitment to accelerate the oil and gas industry's response to climate change.

As individual companies and collectively as OGCI, we are keenly aware that we must take action to support a sustainable economic recovery – one that provides growth while tackling greenhouse gas emissions at scale.

OGCI's FOCUS IN 2020

1. Deliver tangible reductions in emissions intensity

OGCI announced a new collective upstream carbon intensity target and members showed significant progress in meeting their collective methane intensity target and ambition.

2. Coordinate initiatives for maximum impact

OGCI's workstreams created robust short, medium and long term plans that coordinate action and help each of the organization's priority areas to deliver impact, now and in the future.

3. Build the foundations to enable low carbon energy solutions at scale

OGCI and our Climate Investments fund accelerated work with a wide range of stakeholders to help build new commercially viable low carbon businesses.

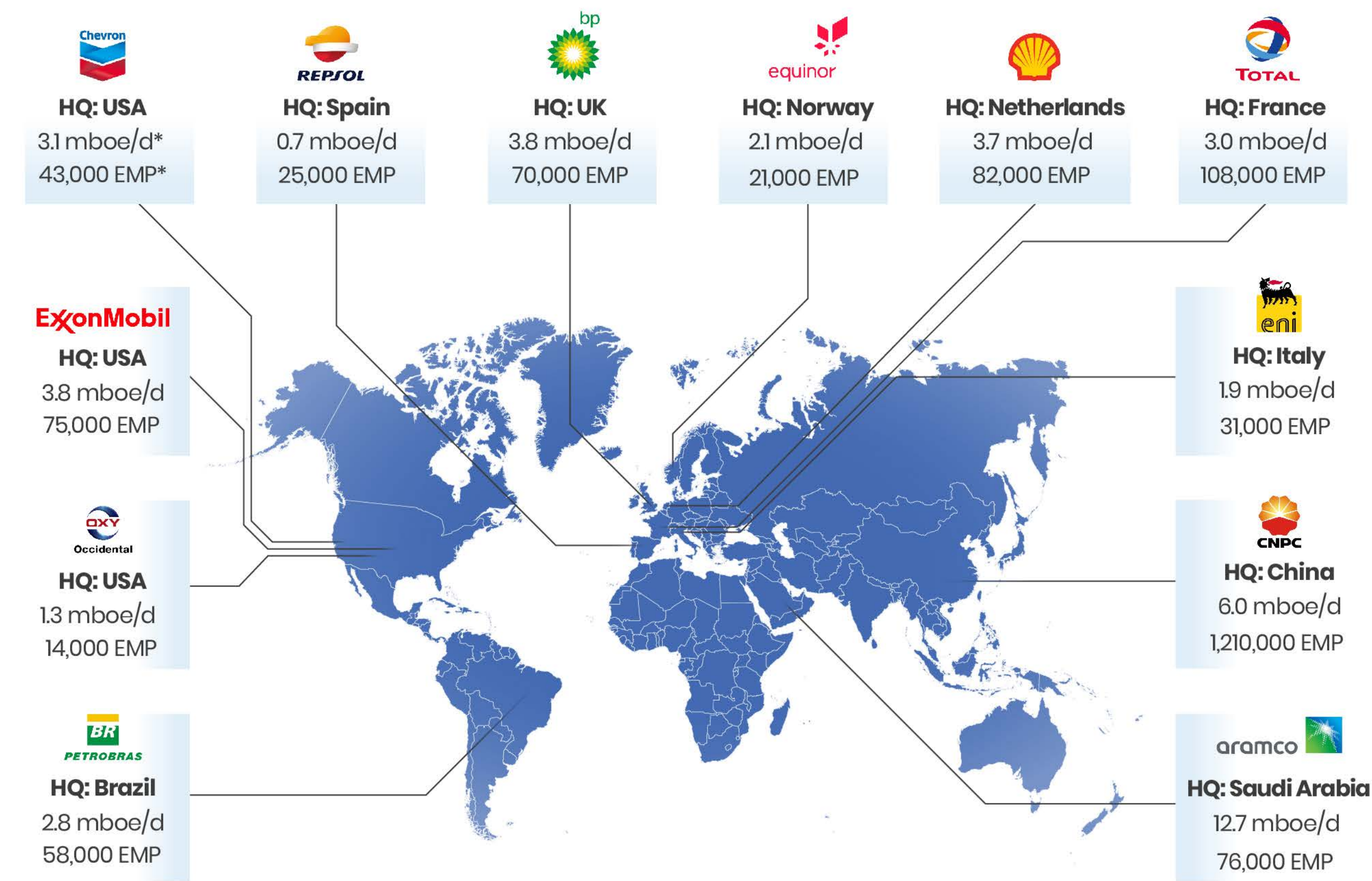
¹ Operated production 2019 for 12 member companies

² Aggregate member companies' upstream and downstream emissions (Scope 1) in 2019

³ Aggregate spend for 10 companies in 2019

OGCI MEMBER COMPANIES IN 2020

OIL & GAS OUTPUT (mboe/d)
EMPLOYEES (EMP)



*Chevron acquired Noble Energy in October 2020; this table does not include Noble’s operations or employees

COLLECTIVE CHALLENGE

All OGCI member companies support the Paris Agreement and its aims. They are also seeking to accelerate the reduction of greenhouse gas emissions, in their own operations, across the industry and in the wider value chain.

Identifying and implementing the best business cases, portfolios and approaches to help advance and thrive in a low carbon emissions future is a commercial imperative for each company.

In tackling the climate challenge, however, the entire industry has an important role to play, in close collaboration with many stakeholders.



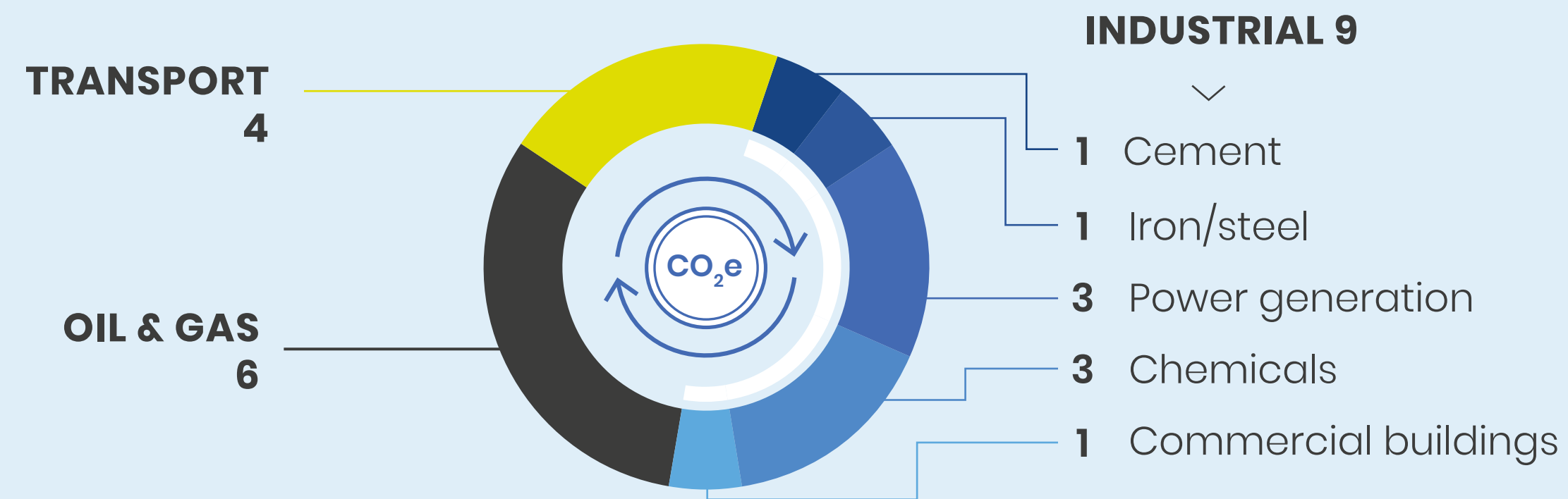
“Learning and taking inspiration from each other’s experiences drives ambition across OGCI – it helps to shape our mindset and collective actions.”

Jérôme Schmitt – Chairman, OGCI Executive Committee

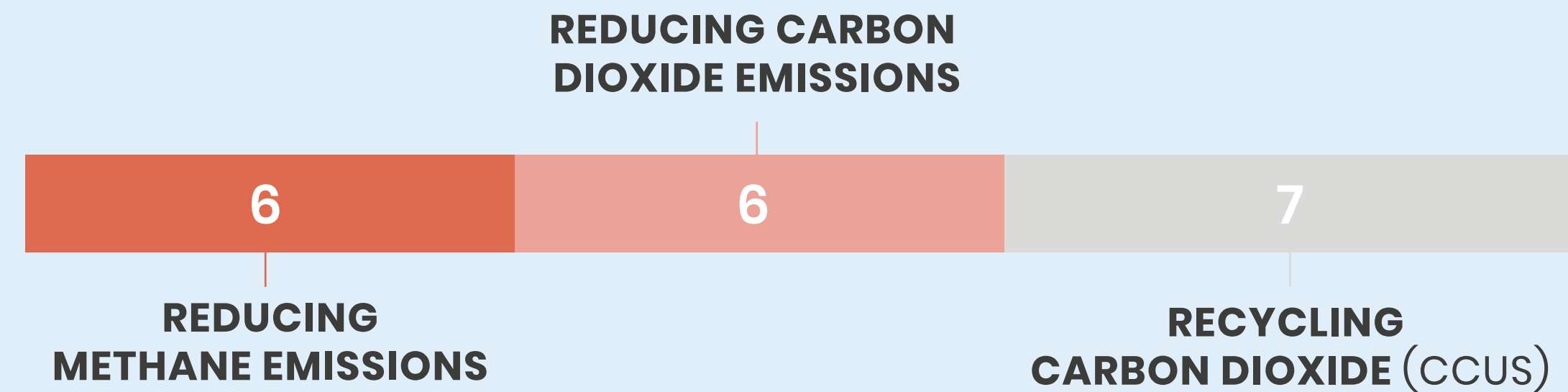
2. OGCI CLIMATE INVESTMENTS LLP

INVESTING FOR CARBON REDUCTION

NUMBER OF INVESTMENTS BY SECTOR



NUMBER OF INVESTMENTS BY FOCUS AREA



OGCI Climate Investments is the US\$1B+ fund set up by the OGCI companies to catalyze low carbon ecosystems.

- We invest in technologies and projects which can demonstrate reduction in methane or carbon dioxide emissions.
- We collaborate with OGCI members and partners to accelerate time to market for our innovators, through pilots and global implementation projects.
- We co-invest with global funds to drive more capital into decarbonization.

Our mission is to deliver carbon reduction.

In 2020, we continued to make investments to reduce methane and carbon dioxide emissions, and to recycle carbon dioxide through carbon capture, utilization and storage (CCUS). Our investments are supported and doing well, with many companies achieving commercial and impact milestones, as detailed in the following pages. We also issued a successful 'call for proposals' for projects to reduce methane emissions. This resulted in over 80 submissions, which are being shortlisted for investment. The global pandemic created many challenges, but also underscored the need for action – we remain committed and active in delivering carbon reduction.

Our three areas of focus are reduction of methane emissions, reduction of carbon dioxide emissions and recycling of carbon dioxide (CCUS).

REDUCING METHANE EMISSIONS

Detect, measure, mitigate



2020 HIGHLIGHTS



SeekOps drone-based technology provides unique capabilities for offshore and onshore measurements with recent dramatic efficiency gains through autonomous multi-site quantification.



GHGSat is proving that global methane emissions monitoring is here. In 2020, GHGSat launched new high-resolution satellite technology providing the smallest ever leak measurement from space.



Kairos aircraft have measured emissions from 136,000 wells and over 42,000 miles of pipeline, resulting in the elimination of around 8 billion cubic feet of methane – and the company has quadrupled revenue since 2019.



Qnergy's Compressed Air Pneumatic systems form the basis of the industry-first Compressed Air as a Service program, mitigating around a thousand tonnes of CO₂e/year/system, by eliminating pneumatic methane emissions.



Clarke Valve reduces control valve fugitive emissions by up to 98%, at a lower cost than incumbent valves. In 2020, it passed stringent ISO certifications, completed successful field trials, and formalized partnerships with Kanoo and Curtiss-Wright.



Kelvin's learning control systems, the Autonomous Production Advisor, developed with Schneider Electric in 2020, uses artificial intelligence to improve field production output and energy efficiency, resulting in reduced emissions.

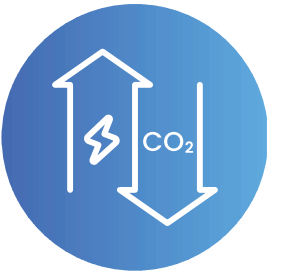
"In order to reduce methane in the atmosphere, we need to detect, measure and mitigate methane emissions. We invest in cost-effective technologies and scalable projects that can deliver substantive emissions reductions."

Rhea Hamilton – Managing Director Ventures, OGCI Climate Investments



REDUCING CARBON DIOXIDE EMISSIONS

Transport, buildings, industry



“Increasing efficiency is a great way to reduce emissions. Less than half of the energy we produce is converted into useful products. The other half is ‘wasted’ but can still produce emissions. We see it across the ecosystem and find terrific opportunities for investment in industrial, commercial and transportation efficiency.”

Ganesh Kailasam – VP Technology OGCI Climate Investments



2020 HIGHLIGHTS

Norsepower reduces fuel consumption, costs and emissions of shipping by up to 20% with their third-party verified, commercially operational auxiliary wind propulsion technology. Since the Maersk tanker project demonstration, it has closed more than €7M of new orders.



Ontruck reduces wasted miles for truckers by up to 50% using artificial intelligence to connect shippers and carriers efficiently, reducing carbon emissions and improving costs.



Achates engines are on the road to sustainable transportation. They are shown to reduce nitrous oxide emissions from commercial vehicles by 90%. Their 2020 project with a major manufacturer aims to meet new regulations in California.



XL’s merger with Pivotal Investment Corp. maintains its leadership position in electrifying the global commercial vehicle fleet. So far, it has deployed over 3,300 systems, covering over 137 million customer miles – avoiding around 25,000 tonnes of carbon dioxide.



In 2020, 75F launched a new software platform using artificial intelligence to pair its indoor air quality sensors with its controls for heating, cooling and lighting. This demonstrated energy savings of around 40%. 75F also released Epidemic Mode™, a US government-compliant free upgrade.



In 2020, Solidia completed its first commercial conversion of a concrete plant consuming 30 tonnes of CO₂ per month and introduced its ready-mix product, Solidia SCM, for low carbon cement.

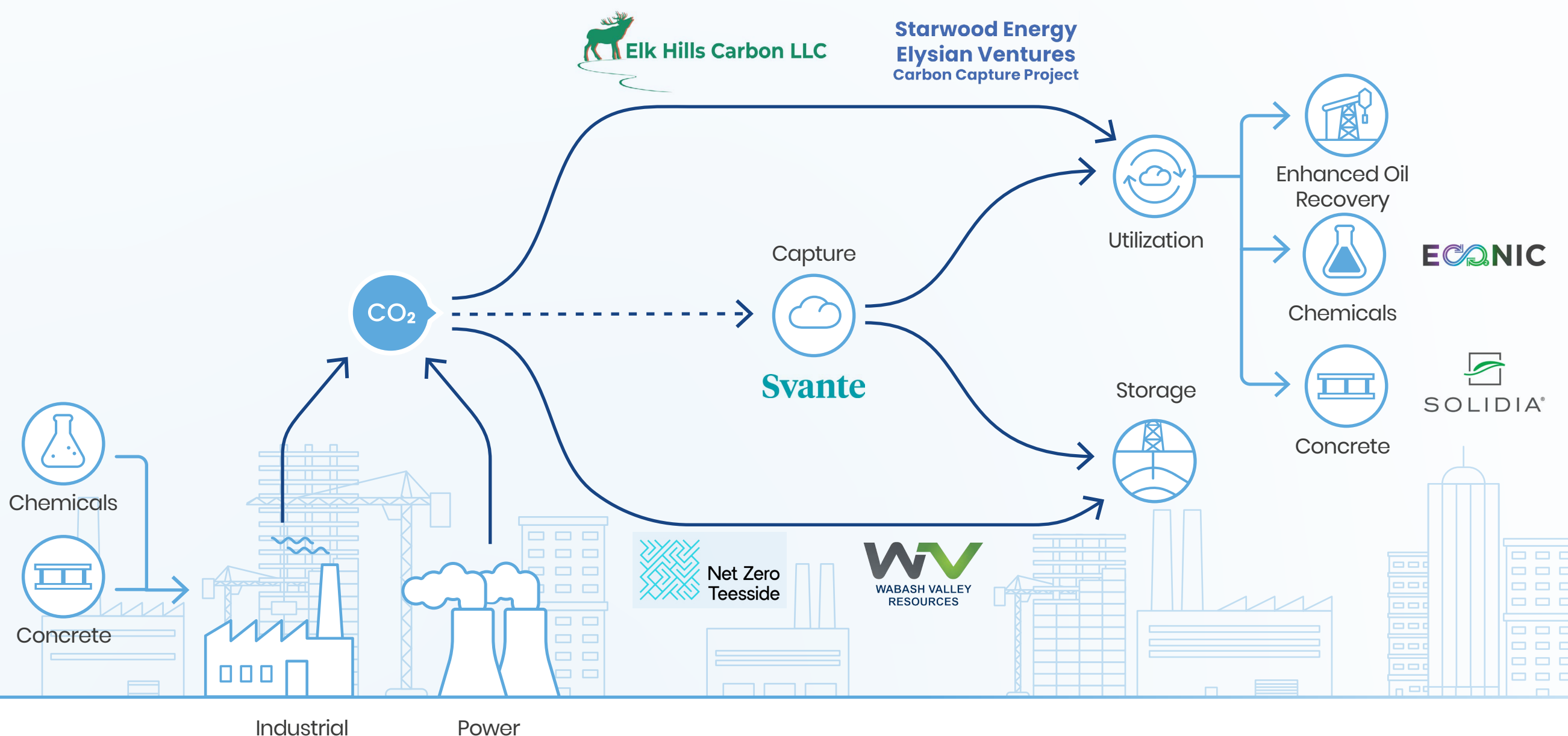


Boston Metal signed its first customer contract with CBMM for ferroniobium manufacturing and laid the foundation for industrial-scale emissions-free steel.

* Solidia technology reduces CO₂ emissions and energy consumption in cement production and utilizes CO₂ to cure concrete. Solidia appears in both Reducing CO₂ and Recycling CO₂.

RECYCLING CARBON DIOXIDE (CCUS)

Capture, utilize, store



“Our goal is to demonstrate that CCUS technologies and projects are economic today where policy is available. We hope the success of such investments will inspire supportive policies in additional jurisdictions and attract much-needed capital to further CCUS deployments.”

James Mackey – Managing Director CCUS, OGCI Climate Investments



**Starwood Energy
Elysian Ventures
Carbon Capture Project**

Svante

EONIC

SOLIDIA*

**Net Zero
Teesside**

**WV
WABASH VALLEY
RESOURCES**

2020 HIGHLIGHTS

The broad range of applications for Svante’s technology is clear in the award of US\$17M by the US Department of Energy for carbon capture from three very different sources: oil & gas operations, cement operations and in a Direct Air Capture plant.

Econic validated its manufacturing capability for its tuneable catalyst which recycles CO₂ into polyols, and announced a partnership with Drax to demonstrate CO₂ utilization in the production of sustainable polyurethanes.

In 2020 Solidia completed its first commercial conversion of a concrete plant consuming 30 tonnes of CO₂ per month and introduced its ready-mix product, Solidia SCM for low carbon cement.

Net Zero Teesside is a project to decarbonize a UK industrial region by capturing and storing up to 10 million tonnes CO₂/year under the North Sea by 2030. The project is now led by five OGCI companies and has secured funding from the UK Industrial Strategy Challenge.

WV Resources characterized subsurface geology for CO₂ sequestration, completed land acquisition and pre-FEED activities for commercializing the largest net-zero carbon US hydrogen plant. The facility will store and capture over 1.5 million tonnes/year.

Elk Hills Carbon is on track to complete the initial FEED study for California’s first commercial carbon capture and storage project with enhanced oil recovery (EOR), which will deliver multiple benefits including clean, reliable and affordable baseload energy with emissions reductions of 1 million tonnes/year.

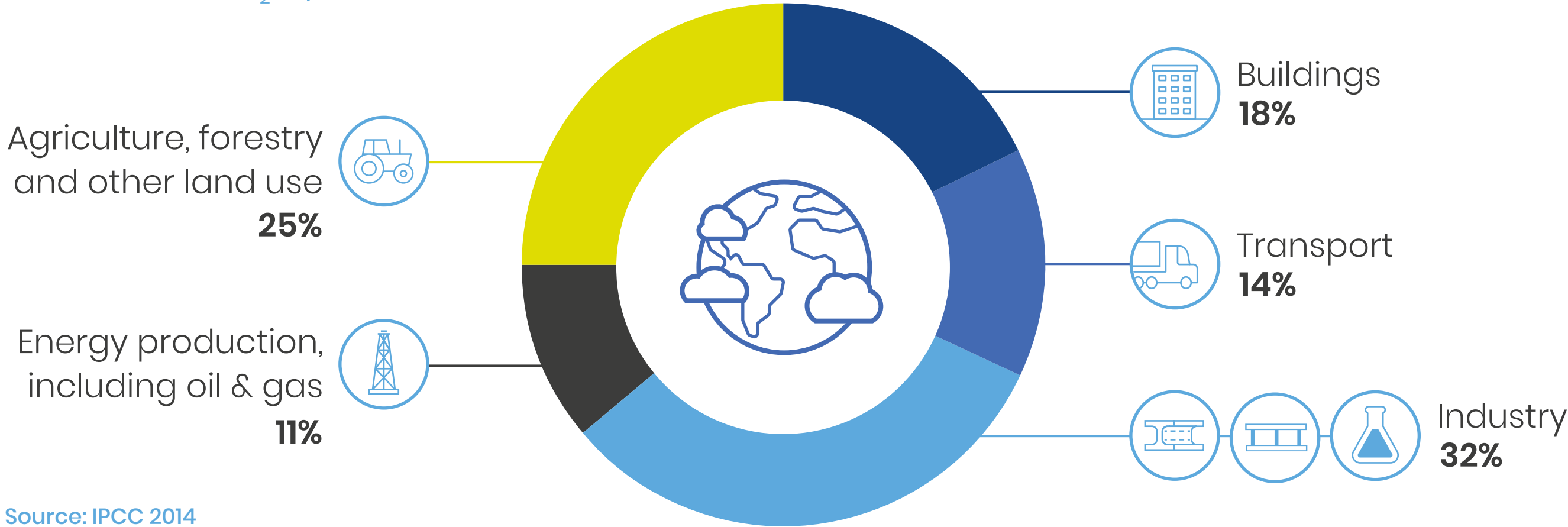
This natural gas-fuelled post-combustion carbon capture project (CCS for EOR) has the potential for carbon emissions reduction of around 1.5 million tonnes/year. Basic engineering and design is complete and FEED has been launched.

* Solidia technology reduces CO₂ emissions and energy consumption in cement production and utilizes CO₂ to cure concrete. Solidia appears in both Reducing CO₂ and Recycling CO₂.

ACCELERATING DECARBONIZATION

THE OPPORTUNITY: GREENHOUSE GAS EMISSIONS BY SECTOR

TOTAL ~50GT CO₂e/year emissions



Source: IPCC 2014
Note: electricity and heat use is allocated by sector

As population and demand for goods and services increase, global greenhouse gas emissions are rising. Addressing the climate challenge requires a systemic reduction of emissions from all parts of our ecosystem, from how we grow and consume food, to how we build and heat or cool our homes, to how we travel and everything we use to power our daily life.

The transformation to a low carbon ecosystem presents a business opportunity for innovators and investors and, in 2020, we are seeing them increasingly step up with technology and capital. The next step for driving the transformation at global scale is to increase the demand for these low carbon goods and services.

Please join us in investing, building businesses and supporting demand creation. contact@climateinvestments.energy

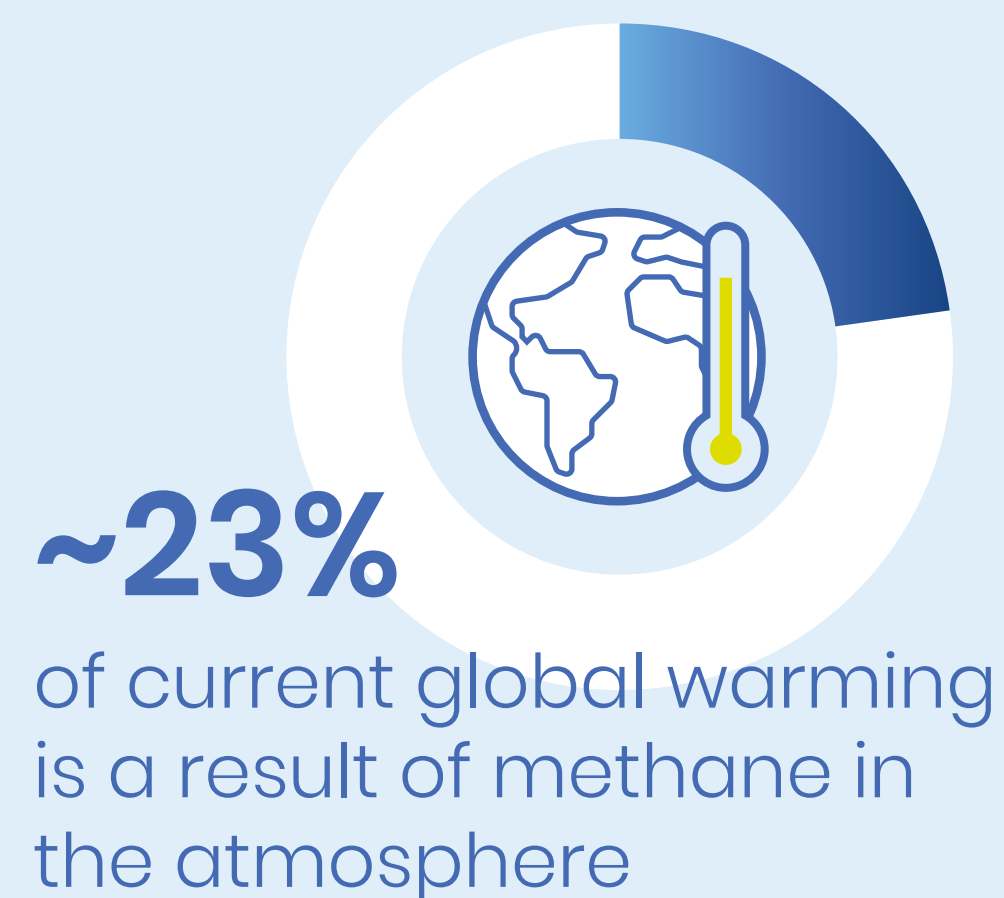
Accelerating the pace of decarbonization requires continued investment in technologies and business models that are economic and implementable. In addition, we need practical, climate-focused policies and supply chain incentives to drive increased demand for low carbon goods and services."

Pratima Rangarajan – CEO, OGCI Climate Investments



“We aim to achieve near-zero methane emissions across the full gas value chain.”

Rosanna Fusco – OGCI Executive Committee Methane Champion; Head of Climate Strategy and Positioning, Eni



Source: Global Methane Budget 2020

3. REDUCING METHANE EMISSIONS

A NEAR ZERO EMISSIONS MINDSET

WHAT?

OGCI member companies have cut their aggregate absolute methane emissions by 22% over the past two years. We are on track to meet our near zero intensity ambition.

WHY?

Reducing methane emissions – significantly and rapidly – is critical. Science shows that methane is a far more potent greenhouse gas than carbon dioxide, but it stays in the atmosphere for a shorter time.

As a result, minimizing methane emissions now can result in an important near-term reduction in the pace of global warming that is complementary to carbon dioxide mitigation. Most methane emissions from human activities come from agriculture and fossil fuels.

Working towards near zero methane emissions from oil and gas is a top priority for OGCI. Aside from the direct emissions benefit, substantially reducing methane

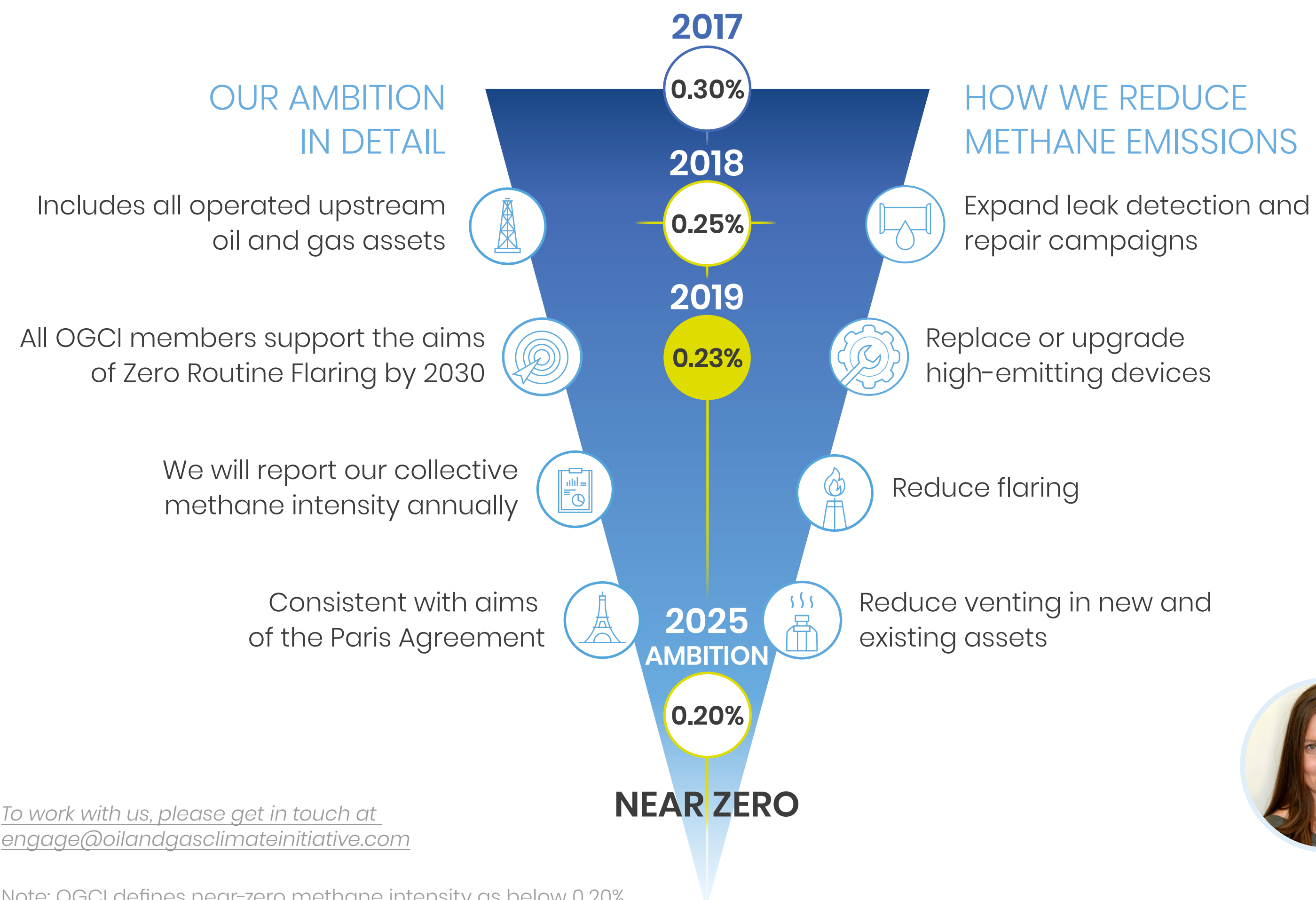
OUR FOCUS – METHANE EMISSIONS

- Reduce operational emissions to near zero
- Share best practice and expand data availability across the oil and gas industry
- Test and deploy new detection and quantification technologies to sustain emissions reductions
- Improve data transparency on global flaring
- Work to increase the accuracy of methane emissions quantification

emissions across the value chain maximizes the climate advantages of natural gas in the energy mix.

With carbon capture and storage, and methane emissions managed along the value chain, natural gas can provide low carbon dispatchable power to support intermittent renewables and be used as a feedstock for low carbon hydrogen.

OGCI'S 2025 METHANE INTENSITY AMBITION



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Note: OGCI defines near-zero methane intensity as below 0.20%

OUR AMBITION

In 2018, OGCI member companies announced a target¹ to reduce by 2025 the collective average methane intensity of aggregated upstream oil and gas operations to below 0.25% with the ambition to achieve 0.20%. Having surpassed our 0.25% intensity target, we are now working towards our ambition of 0.20%.

HOW?

A change in membership² shifted our 2017 baseline (from 0.32% to 0.30%) – but there is also real progress. Member companies have reduced absolute aggregate upstream methane emissions by 7% in 2019 and by 22% since 2017. This demonstrates how adopting a near zero methane emissions mindset has helped member companies to accelerate the pace of reduction using existing and emerging technologies. We are now exploring how to improve our target further and expand our impact across the full gas value chain.



“Increased data transparency will enable governments and our industry to make more informed and precise decisions to reduce both flaring and methane emissions.”

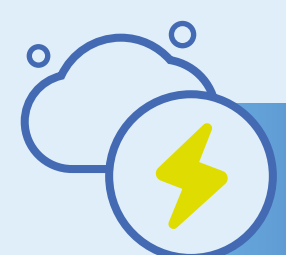
Vanessa Ryan – Head of OGCI’s Role of Gas workstream, Manager of Carbon Reduction, Chevron

¹ For more details on the methodology, see the OGCI Reporting Framework.
² Pemex is no longer an active member of OGCI. The addition of Chevron, ExxonMobil and Occidental in 2018 did not impact the original baseline set in 2017.

“Our aim is to unlock the potential of energy efficiency as a powerful, near-term decarbonization lever.”



Fernando Ruiz Fernandez –
OGCI Energy Efficiency Champion,
Director of Sustainability, Repsol



~75%

of carbon dioxide emissions from OGCI member company operations comes from the energy used to power them

Source: McKinsey 2020

4. REDUCING CARBON DIOXIDE EMISSIONS

TACKLING THE DECARBONIZATION CHALLENGE

WHAT?

OGCI’s new upstream carbon intensity target is already showing results – now we are expanding our ambition further.

WHY?

Reducing carbon dioxide emissions is at the heart of the energy transition. There have been signs of the decoupling of emissions from economic growth, especially in Europe and the US¹. That divergence

is needed for the world to move towards net zero emissions while fostering job creation and prosperity. To translate these successes into durable global transition pathways, faster progress and additional decarbonization options are needed, especially in difficult to abate sectors.

OUR TARGET

OGCI’s new collective target, announced in July 2020, aims to reduce member companies’ aggregate upstream carbon intensity from 23 kg of greenhouse gases per barrel of oil or gas in 2017 to 20 kg by 2025². Achieving this would mean a reduction of 13% in carbon intensity against the 2017 baseline.

This near-term target covers both carbon dioxide and methane emissions from operated upstream oil and gas exploration and production activities, as well as emissions from associated imports of electricity and steam. We are working on initiatives to address liquefied natural gas (LNG) separately.

OUR FOCUS – CARBON DIOXIDE EMISSIONS

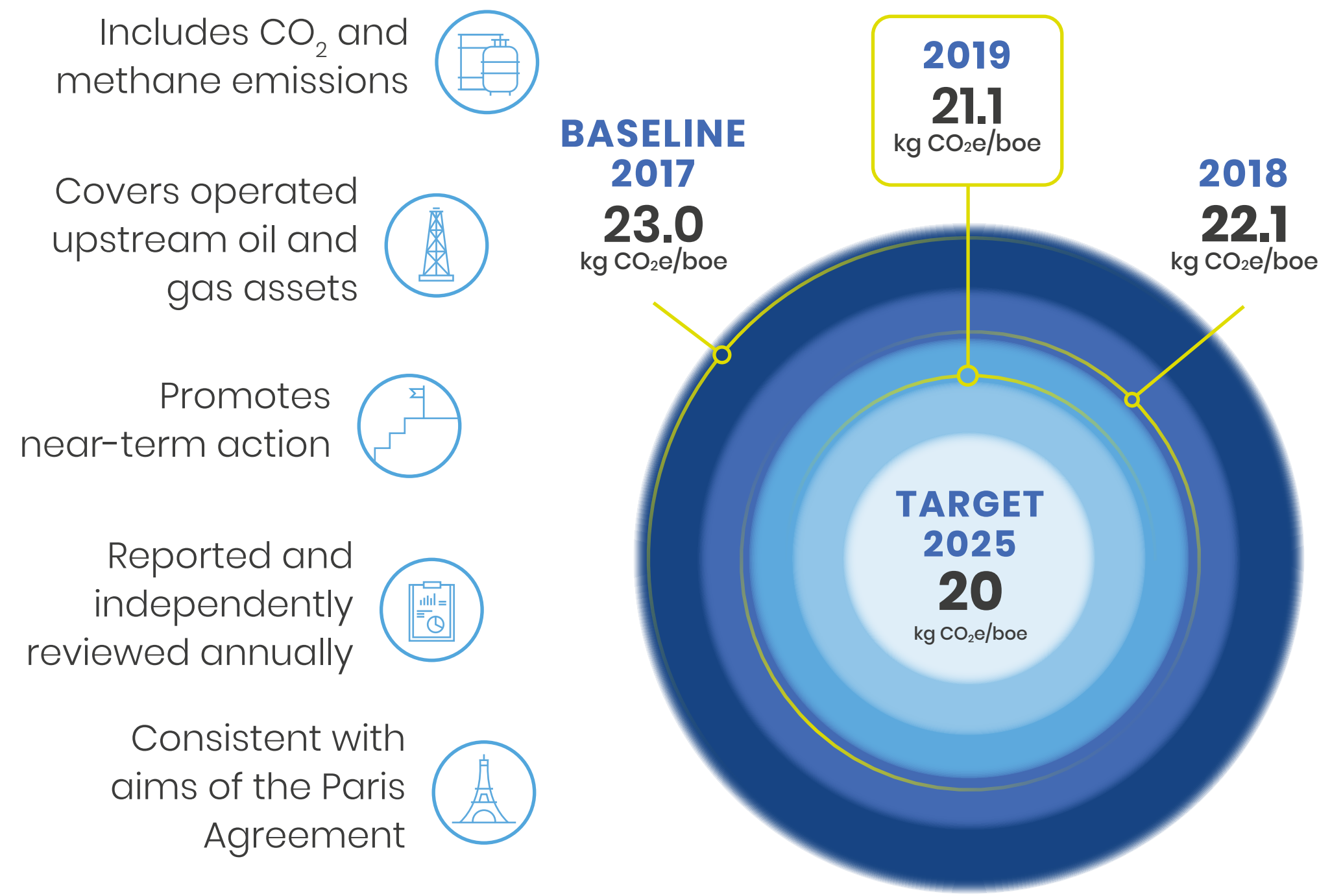
- Reduce emissions from member company operations, expanding from our upstream focus to refineries and LNG
- Share our knowledge on energy management with the rest of the sector and other industries
- Work in collaboration with customers in hard-to-abate areas to help them decarbonize

¹ International Energy Agency, Global CO₂ emissions in 2019, February 2020.

² For the detailed methodology of the carbon intensity target, see the OGCI Reporting Framework.

OGCI'S UPSTREAM CARBON INTENSITY TARGET

OUR TARGET IN DETAIL



HOW WE REDUCE CARBON EMISSIONS

- Improve energy efficiency
- Co-generate electricity and useful heat
- Zero routine flaring by 2030
- Electrify operations with renewables where possible
- Near zero methane emissions

HOW?

The latest consolidated data for 12 companies shows that our aggregate upstream carbon intensity level has fallen 7% over the past two years to reach 21.1 kg CO₂e/boe. That translates into an absolute reduction of 21 million tonnes of CO₂e, equivalent to the carbon dioxide emissions from energy use in 2.4 million US homes³. This progress has encouraged us to aim for the most ambitious end of the target range we had originally set, with the goal of achieving a level of 20 kg CO₂e/boe by 2025.

Effective decarbonization measures

Reducing carbon intensity relies on all member companies putting effective decarbonization measures in place, now and over the next five years, to meet the 2025 target. Continued efforts to reduce methane emissions and flaring are essential – and longer-term initiatives to leverage CCUS will start to play a role as efforts scale up. For many companies, however, the strongest lever to significantly reduce emissions by 2025 is improved energy management – that is, energy efficiency initiatives, electrification of operations, integration of renewables, or co-generating electricity and heat.

The OGCI metric **kgCO₂e/boe** measures greenhouse gases (expressed as carbon dioxide equivalents) per barrel of oil equivalent (which includes gas).

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³ Data from the Environmental Protection Agency, based on US energy usage

“Transport fuels are the lifeblood of the global economy and we see opportunities to deploy innovative, low carbon products.”

Omar Abdulhamid –
OGCI Transport Champion,
General Manager, Environmental
Protection, Saudi Aramco



5. DECARBONIZING TRANSPORT

GETTING LOW CARBON FUELS TO MARKET

WHAT?

OGCI is working with stakeholders in shipping and aviation to test the feasibility of low carbon fuels and mobile carbon capture. We aim to reduce transport emissions at scale and start to have impact within the next five years.

HOW MEMBER COMPANIES ARE WORKING TO HELP DECARBONIZE TRANSPORT

- Produce alternative low carbon fuels such as hydrogen, ammonia, advanced biofuels and synthetic fuels
- Provide electric charging infrastructure
- Invest in new approaches to mobility
- Develop mobile carbon capture technologies

GLOBAL CARBON DIOXIDE EMISSIONS BY TRANSPORT SEGMENT, 2018

GIGATONNES CO₂



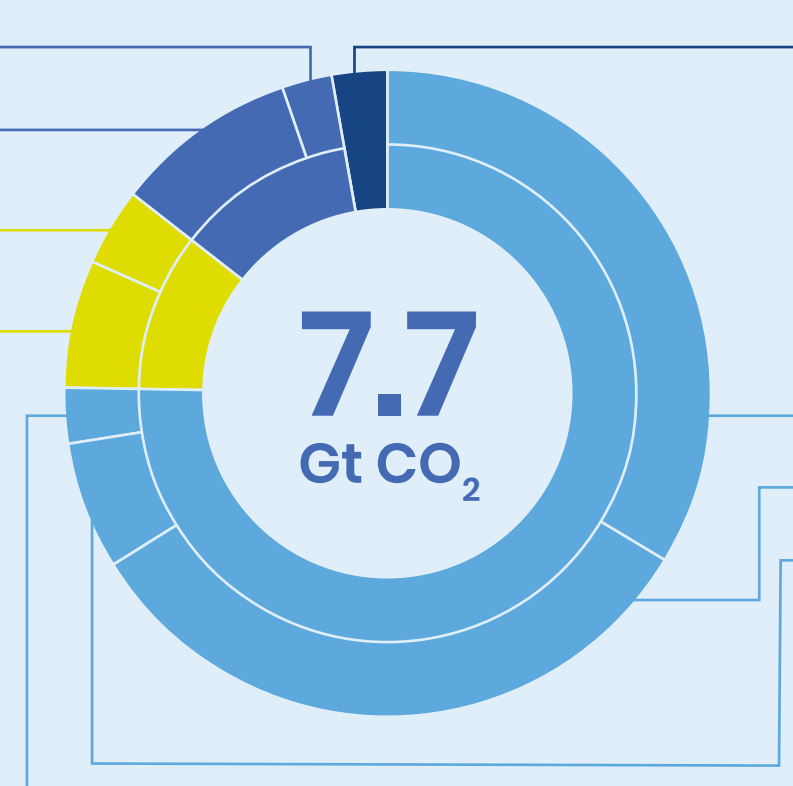
AVIATION

Domestic 0.3
International 0.5



SHIPPING

Short sea 0.2
Deep sea 0.7



Other 0.2



ROAD TRANSPORT

Trucks 2.6
Cars 2.5
Buses 0.5
2-3 wheelers 0.2

Sources: IEA, McKinsey

WHY?

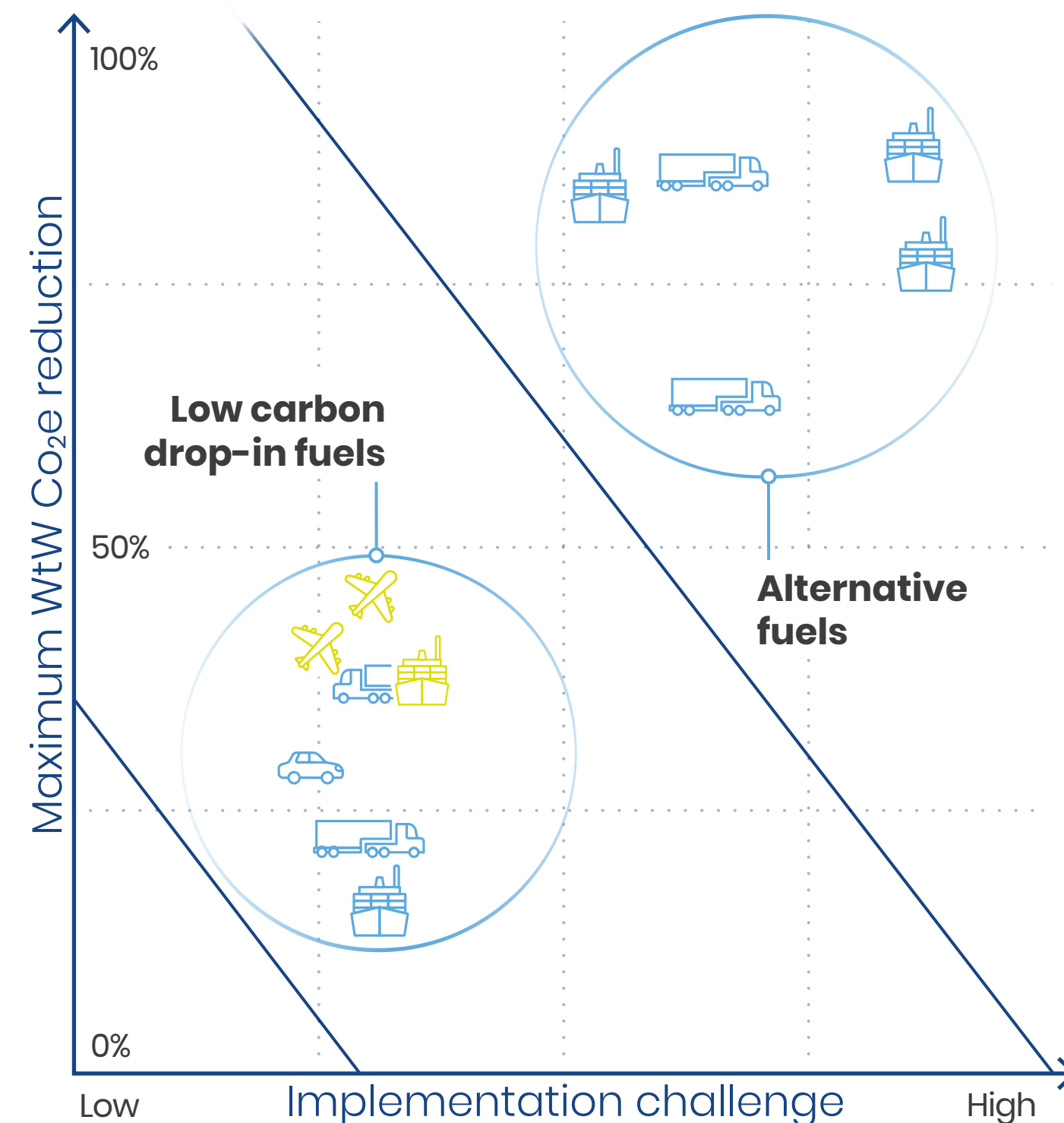
The transport sector accounts for 27% of total energy-related carbon dioxide emissions globally¹. Electrification is already playing a role in reducing emissions², but a broader portfolio of solutions is needed to accelerate and deepen decarbonization. That is particularly important in those transport segments that are difficult to abate, such as long-distance aviation and shipping.

While the repercussions of Covid-19 may temporarily slow the pace of emissions growth from these areas, working on a sustainable long term decarbonization pathway is crucial. Both sectors have announced ambitions to halve emissions by 2050 – but are still working to identify a portfolio of solutions to achieve this.

¹ International Energy Agency, CO₂ Emissions from Fuel Combustion, July 2020

² International Energy Agency, Global EV Outlook 2020

DECARBONIZATION POTENTIAL OF LOW CARBON AND ALTERNATIVE FUELS



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HOW?

OGCI's assessment of low carbon fuels³ has shown emissions reduction potential of 80-90% for alternative fuels (such as blue or green hydrogen, ammonia and methanol) in some transport sub-sectors – but scale up would take years to implement because they require new infrastructure, recertification and modifications. Since hydrogen plays a strong role in all these long-term solutions, OGCI is currently working to define a collective hydrogen project that would help to accelerate implementation.

Blended low carbon fuels

In the short term, we found that blending low carbon fuels with existing fuels could reduce emissions by as much as 50% and be implemented relatively quickly, since they harness existing infrastructure and can be used as 'drop-in' fuels in today's vessels and aircraft.



“Whether used as a transport fuel or as a building block further upstream, hydrogen will be a cornerstone of the future global energy mix and is a key long-term focus for OGCI.”

Zhou Aiguo – OGCI Transport Champion; Vice General Manager, Quality, Health and Safety and Environment, CNPC



In deep-sea shipping, OGCI is exploring opportunities to demonstrate the production of a low carbon drop-in⁴ marine fuel based on sustainable waste biomass.



In aviation, where there has already been activity in biofuels, OGCI is exploring a low carbon drop-in synthetic fuel, based on using renewable power to blend components from low carbon hydrogen and captured carbon dioxide.

Mobile carbon capture

OGCI is also working on a joint feasibility study, with Swedish shipping operator Stena Bulk, to evaluate the potential for capturing carbon dioxide on a ship out at sea. Aramco has already demonstrated 40% carbon capture on a heavy-duty truck. We are leveraging this work to help define the best vessel type and capture technology, evaluate engineering requirements, and analyze costs to build a prototype system.

³ OGCI, The role of low carbon fuels in decarbonizing transport, August 2020

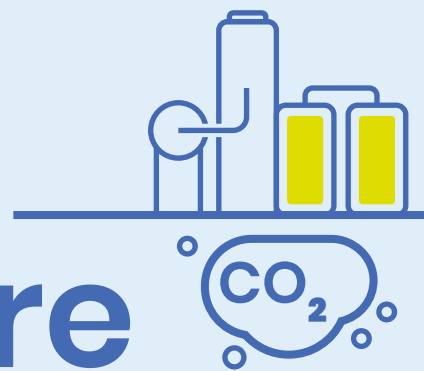
⁴ A fuel blending component that allows for the final fuel blend to meet an existing fuel specification and to be used in an existing engine without modification.

“CCUS is a key enabler for energy transition – and focusing on low carbon hubs is a way to leverage economies of scale while accelerating deployment.”



Sue-Ern Tan – OGCI CCUS Champion;
Group Carbon Relations Manager, Shell

38× more



carbon dioxide needs to be stored to reach the 1.5 Gt annual storage volume required by 2030

Source: International Energy Agency

6. ACTIVATING CCUS AS A DECARBONIZATION LEVER

SCALING UP AND STANDARDIZING CCUS

WHAT?

We have helped to make progress on four carbon capture, use and storage (CCUS) industrial hubs that are now on course to be operational before 2025. We added two new hubs to our KickStarter initiative and started building a pipeline of high-potential projects.

WHY?

CCUS is gaining significant momentum. Over 30 new projects have been announced in the past two years, adding to the 20 or so in operation¹. Nevertheless, a massive scale-up is needed if CCUS is to develop at the scale required to support the aims of the Paris Agreement.

HOW?

CCUS is one of OGCI's top priorities. We aim to facilitate the emergence of a commercially viable CCUS industry that can safely store carbon dioxide in a safe, permanent and environmentally responsible manner on a gigatonne scale – working with multiple stakeholders to achieve that goal.

Our member companies have significant expertise and experience in CCUS. Some have built the world's largest CCUS facilities, such as Gorgon in Australia and Quest in Canada. Other member companies have been successfully storing carbon dioxide from natural gas processing for decades or are experts in injecting and sequestering carbon dioxide as a means of enhancing oil recovery.



Storing billions of tonnes of carbon dioxide globally requires a high level of confidence in the availability of suitable geological storage resources in the places they are needed. That is why OGCI helped to launch the CO₂ Storage Resource Catalogue in 2020. This centralized publicly available database evaluates independently published information on storage sites and is updated annually.

¹ International Energy Agency, CCUS in Clean Energy Transitions, September 2020

CCUS KickStarter – leveraging economies of scale

OGCI launched the CCUS KickStarter initiative in 2019 to help drive down costs, demonstrate the impact of CCUS-enabling policies and attract widespread commercial investment. We are doing this by facilitating the emergence of multiple CCUS hubs which help accelerate deployment and reduce costs through collective carbon transport and storage infrastructure.

We have made significant progress in 2020:

- Four of the initial hubs we identified are now on course to be operational before 2025 – Net Zero Teesside, Northern Lights, Rotterdam and China-Northwest.
- We have split our US Gulf of Mexico hub into a Texas and a Louisiana hub, in order to accelerate progress.
- We have added a new Canadian hub in Edmonton and are exploring several potential hubs in Europe.

In 2021, we plan to focus on identifying new hubs in emerging economies – sharing the lessons learned and knowledge gained from existing hubs and projects as we move forward.

In several European countries – such as Norway and France – CCUS has received more urgent attention during the Covid-19 crisis, as national and regional governments focus on setting sustainability criteria in their recovery and investment support. There is also growing interest in carbon dioxide storage from non-energy sectors that have announced ambitions to be net zero or net negative emitters.

We are working closely with the Clean Energy Ministerial (CEM) CCUS Initiative² and other stakeholders to develop, share and communicate the knowledge and experience we are gaining from our KickStarter work, so that a broader range of countries and companies can leverage CCUS to reach their climate goals in a way that adds value at the lowest cost.

OGCI'S CCUS KICKSTARTER

HUBS WITH A DEFINED CCUS CONCEPT

- Hub 1**
Net Zero Teesside, UK
- Hub 2**
Northern Lights/Longship, Norway
- Hub 3**
Rotterdam, Netherlands
- Hub 4**
China North-West

HIGH POTENTIAL HUBS UNDER EVALUATION

- Hub 5**
Texas, USA
- Hub 6**
Louisiana, USA
- Hub 7**
Edmonton, Canada



To work with us, please get in touch at engage@oilandgasclimateinitiative.com

² The Clean Energy Ministerial CCUS Initiative brings together energy ministers from 11 countries (Canada, China, Japan, Mexico, Netherlands, Norway, Saudi Arabia, South Africa, UAE, UK, USA). OGCI and CEM signed a joint declaration on accelerating the CCUS industry in 2019.

7. OGCI PERFORMANCE DATA 2019

PRODUCTION

The aggregate oil and gas production of the 12 OGCI member companies rose by 1% in 2019, largely due to a rise in natural gas production. Operated oil production remained stable at 30 Mboe/day, while gas production rose 2% to reach 16 Mboe/day.

OGCI member companies now operate 28% of global oil and gas production and represent 16% of total primary energy demand¹.

Natural gas represents just over a third of OGCI member companies' operated oil and gas portfolio, at 34% in 2019, slightly up on 2018. OGCI member companies represent almost a quarter of global natural gas production, at 23% in 2019.

AGGREGATE OGCI INDICATORS	UNIT	2017	2018	2019
OGCI oil production (operated)	Mboe/day	29.8	30.0	30.1
OGCI gas production (operated)	Mboe/day	15.2	15.5	15.8
OGCI oil and gas production (operated)	Mboe/day	45.0	45.6	45.9
Share of natural gas in OGCI operated portfolio	%	33.8	34.1	34.4
OGCI oil and gas production (equity)	Mboe/day	42.5	42.3	42.5

OGCI data is collected and reviewed by EY, as an independent third party. In 2020, EY issued a limited assurance statement, which is available on our website.

Notes:

1. According to data from IEA WEO-19, global oil and gas production in 2018 was 163 Mboe/day. Oil production in 2018 was 95 Mboe/day, while natural gas production was 68 Mboe/day. Total global energy demand in 2018 was 288 Mboe/day. Primary energy means energy contained in raw fuels and other forms of energy that are used as inputs.

Operated production – Total output produced under a company's control and responsibility

Equity production – Total output in operations that are owned by a company (calculated according to ownership share)

Mboe/day – Million barrels of oil equivalent per day

Read more about data definitions and methodology in the OGCI Reporting Framework

7. OGCI PERFORMANCE DATA 2019

GREENHOUSE GAS EMISSIONS

As preparation for launching our upstream carbon intensity target in July 2020, we further aligned our methodology for calculating operated Scope 1 and 2 greenhouse gas emissions intensity. In 2019 our aggregate upstream carbon intensity fell by 5%, bringing the total reduction from the 2017 baseline to 7%.

OGCI member companies' aggregate absolute Scope 1 operated greenhouse gas emissions, both upstream and downstream, fell by 1% in 2019 and by 4% from 2017. At 678 MtCO₂e, they represent 1.4% of global greenhouse gas emissions, using data from the UNEP's Emissions Gap Report 2019. Upstream emissions represent 50% of total aggregate Scope 1 emissions.

AGGREGATE OGCI INDICATORS	UNIT	2017	2018	2019
Upstream carbon intensity¹	kgCO ₂ e/boe	22.7	22.1	21.1
Total greenhouse gas emissions (Scope 1)²	MtCO ₂ e	709	684	678
of which: upstream GHG emissions (Scope 1)³	MtCO ₂ e	362	346	339
Upstream greenhouse gas emissions (Scope 2)	MtCO ₂ e	41.4	43.9	43.5

Notes:

1. This is the key performance indicator for OGCI's upstream carbon intensity target. It includes upstream carbon dioxide and methane emissions, both Scope 1 & 2, on an operated basis. It excludes emissions from gas liquefaction.
2. 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).
3. 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.

kgCO₂e/boe – Kilograms of carbon dioxide equivalent per barrels of oil equivalent

MtCO₂e – Million tonnes of carbon dioxide equivalent

7. OGCI PERFORMANCE DATA 2019

METHANE EMISSIONS

This year we adjusted our methane intensity baseline and progress measurements to accommodate 12 rather than 13 active member companies, reducing the baseline from 0.32% to 0.30%. As a result, and along with data corrections for 2018, we met our initial methane intensity target in 2018. Following continued progress in 2019, we are now on track to meet our 2025 ambition of 0.20%.

Our collective upstream methane intensity has fallen by 25% since 2017, with a 9% drop in 2019 to 0.23%. Absolute methane emissions, including both upstream and downstream, fell 7% over the year and 22% over two years.

AGGREGATE OGCI INDICATORS	UNIT	2017	2018	2019
Upstream methane intensity ¹	%	0.30	0.25	0.23
Methane emissions – upstream	MtCH ₄	2.0	1.6	1.5
Methane emissions ²	MtCH ₄	2.1	1.8	1.7

Notes:

1. This is the key performance indicator for OGCI’s 2025 collective upstream methane target. It includes total upstream methane emissions from all operated gas and oil assets. Emissions intensity is calculated as a share of marketed gas.

2. This figure includes relevant operated activities (upstream, refineries, petrochemicals, power generation etc where these are operated by the company).

MtCH₄ – Million tonnes of methane

7. OGCI PERFORMANCE DATA 2019

FLARING

Upstream flaring intensity fell by 4% in 2019 and by 13% since 2017, reflected in falling emissions from flaring. This improvement was due to lower flaring volumes, linked to flare reduction projects, better compressor reliability and reduced start-up periods.

Routine flaring data has been collected for the first time in 2019 – it accounted for 24% of total volumes flared for the 10 member companies that reported data in 2019.

AGGREGATE OGCI INDICATORS	UNIT	2017	2018	2019
Upstream flaring intensity¹	Mm ³ /Mtoe	10.8	9.7	9.4
Natural gas flared – upstream	Mm ³	24,221	22,061	21,416
Routine gas flared – upstream (10 companies)	Mm ³	–	5,162	5,163
Flaring greenhouse gas emissions – upstream	MtCO ₂ e	62	57	54

Note:

1. Upstream flaring Intensity is calculated on the basis of the volume of gas flared per million tonnes of oil equivalent produced on an operated basis.

Mm³ – Million cubic metres

7. OGCi PERFORMANCE DATA 2019

INVESTMENT AND R&D IN LOW CARBON TECHNOLOGIES

Given the importance of monitoring performance in low carbon spending, we have clarified the definitions for collecting this information and revised past data from 2017 on this basis. The companies that provided information (10 for investment and nine for research and development (R&D)) spent a total of US\$7.4 billion in low carbon technologies in 2019, an increase of 12% over the year and 35% over 2017.

In addition, R&D spending in low carbon energy (reported by nine companies) remained at just over US\$1 billion in 2019 – amounting to 17% of total R&D spend for those companies.

AGGREGATE OGCi INDICATORS	UNIT	2017 (number of companies providing data)	2018	2019
Total investment in low carbon technologies¹	US\$ billion	4.7 (10)	5.6 (10)	6.4 (10)
of which: acquisitions	US\$ billion	0.3 (10)	0.9 (10)	1.1 (7)
R&D expenditures on low carbon technologies²	US\$ billion	0.7 (9)	1.0 (9)	1.0 (9)
Low-carbon R&D as a share of total R&D spend	%	9 (9)	16 (9)	17 (9)

Notes:

1. Low carbon energy technologies include but are not limited to wind, solar and other renewable energies, carbon-efficient energy management, CCUS, blue or green hydrogen, biofuels, energy storage and sustainable mobility.
2. R&D spending is additional to investment.



WHAT IS THE OIL AND GAS CLIMATE INITIATIVE?

The OGCI is a CEO-led initiative that aims to accelerate the industry response to climate change. OGCI member companies explicitly support the Paris Agreement and its aims.

As leaders in the industry, accounting for almost 30% of global operated oil and gas production, we aim to leverage our collective strength and expand the pace and scope of our transitions to a low-carbon future, so helping to achieve net zero emissions as early as possible.

Our members collectively invest over \$7B each year in low carbon solutions. OGCI Climate Investments was set up by members to catalyze low carbon ecosystems. This US\$1B+ fund invests in technologies and projects that accelerate decarbonization in oil and gas, industry and commercial transport.

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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.

Cautionary statement

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 – as well as statements related to the future energy mix. 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.