OIL AND GAS CLIMATE INITIATIVE

Role of low-carbon Natural Gas & Hydrogen to support the energy transition

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OUR MEMBER COMPANIES

aramco bp Chevron CNPC eni equinor ExxonMobil Occidental PETROBRAS REPSOL Shell TOTAL

Oil and Gas Climate Initiative (OGCI)

THE INITIATIVE : *LOWER CARBON VIA COLLECTIVE ACTION & PARTNERSHIPS*

- CEO-led
- Voluntary
- Ambitious
- Additional
- Action oriented

PARIS2015 COP21-CMP11

Paris Agreement

Our Focus

CCUS	**Role of Gas**	**Transport**
Energy Efficiency	**Low Emission Opportunities**	**Natural Climate Solutions**

CLIMATE INVESTMENTS : *LOWER CARBON VIA INVESTMENTS*

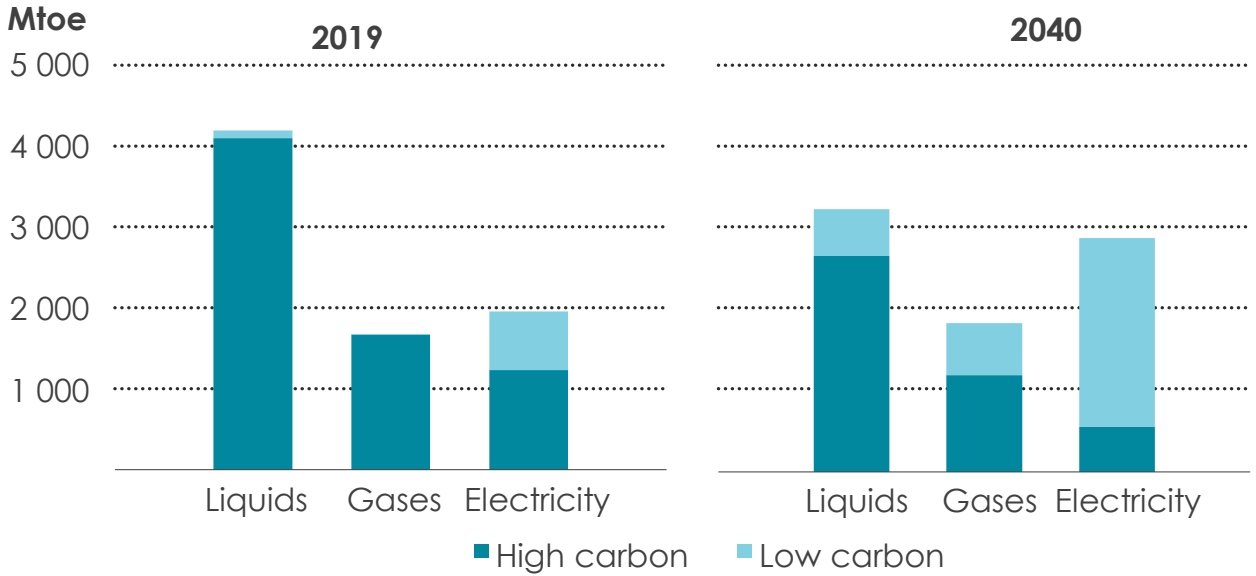
INVEST in innovative low-carbon technologies and solutions.

SUPPORT our portfolio companies with access to customers and deployment.

COLLABORATE with OGCI members and other stakeholders to gain speed and global reach.

IEA Energy Consumption in 2040 in the Sustainable Development Scenario

Final energy consumption by carrier in 2019 and 2040 in the Sustainable Development Scenario



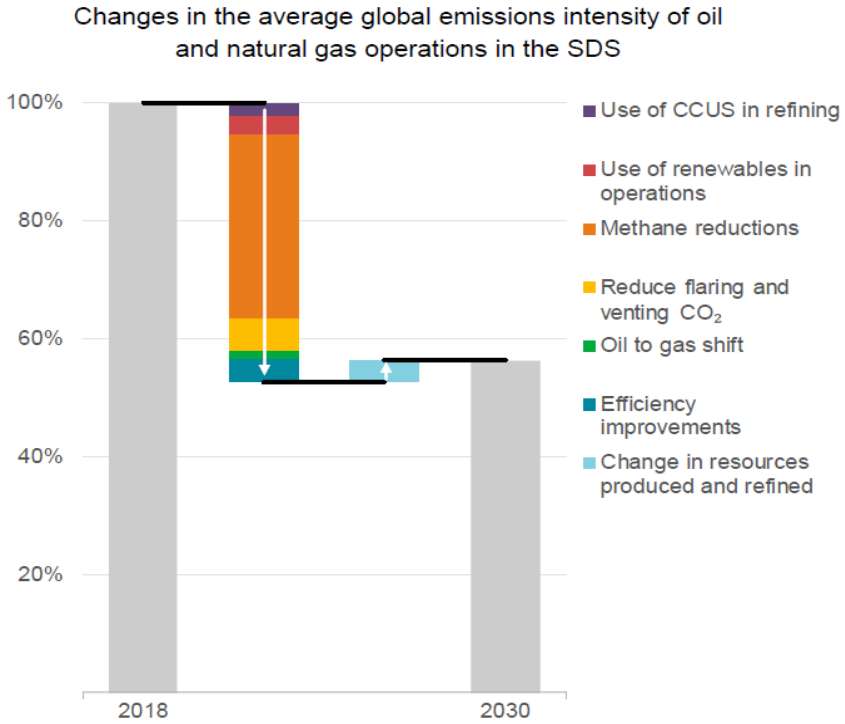
The share of electricity, and notably low carbon electricity, in global final energy consumption in 2019 is set to rise, with low-carbon liquids & gasses supporting the electrification of the energy system.

20% of the reduction efforts to meet the Paris Agreement goals will come from ramping up CCUS and H2

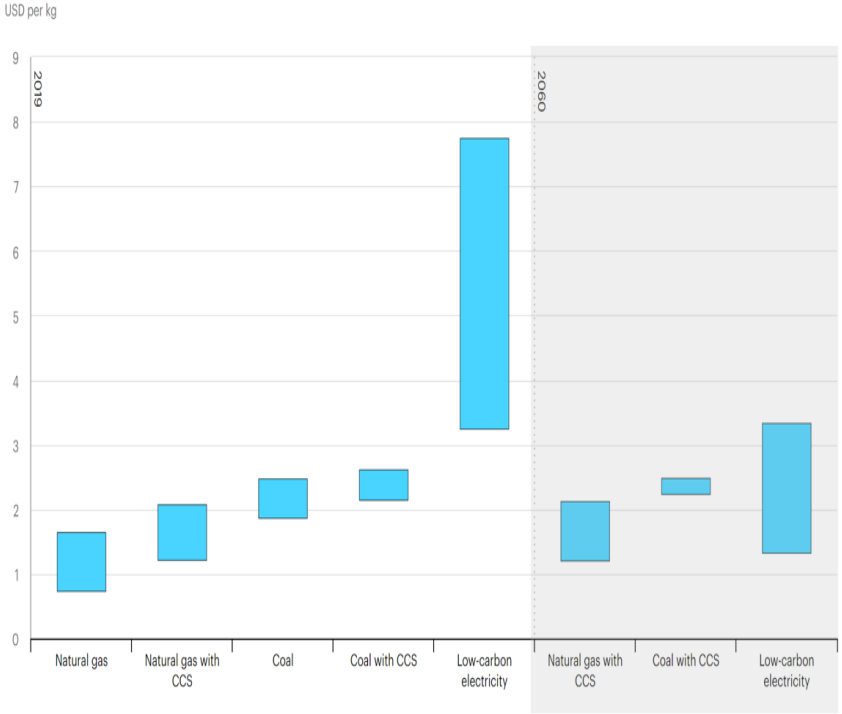
Source: IEA (WEO, 2020)

Tackling GHG emissions from the natural gas and H2 value chains

O&G global emissions intensity in 2030



H2 current and future production costs



Sources: Bloomberg (2020), IEA (The O&G Industry in the Energy Transition, 2020)

Role of the O&G industry to reduce CH4 emissions

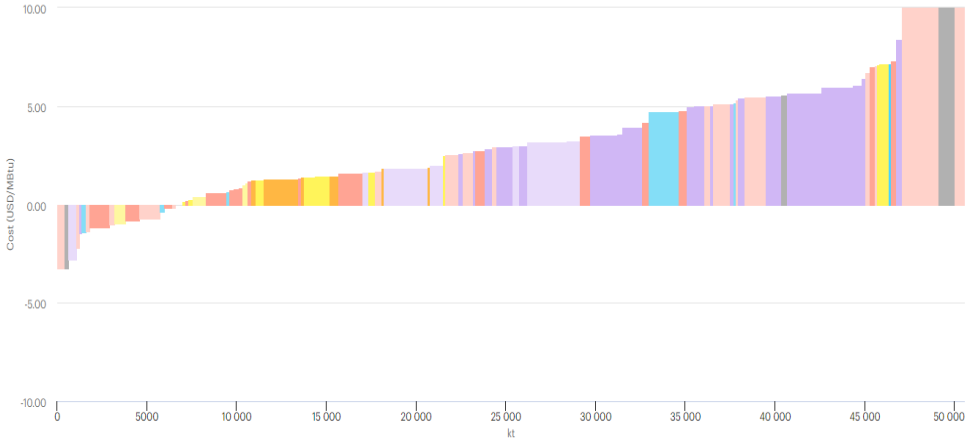
Size of the Price

CH4 emissions from O&G:
72 Mt CH4 / year (1.8 Gt CO2e / year)

Levers to reduce CH4 emissions:

1. Standardised monitoring, reporting and verification (MRV) framework.
2. Working practices and technology standards to avoid or reduce methane emissions.
3. Targets for methane emission reduction from the oil and gas sector.
4. Approaches for evaluating the greenhouse gas/methane intensity of natural gas for different segments of the value chain.

IEA MACC: Total possible abatement of 51 Mt CH4 / year, of which 15% at no net cost



Abatement technologies What do these mean?

Replace existing devices	Early replacement of devices; Replace pumps; Replace compressor seal or rod; Replace with instrument air systems; Replace with electric motor
Install new devices	Vapour recovery units; Blowdown capture; Install flares; Install plunger
Leak detection & repair	Upstream LDAR; Downstream LDAR
Other	Other

Net negative mitigation opportunities include (1) Downstream LDAR, (2) replace high-bleed pneumatic devices on conventional onshore, (3) blowdown capture for unconventional gas assets, (4) detection of super-emitters via satellites, etc.

Sources: IEA (Methane Tracker, 2021), OGCI (Position Papers, 2021)

Role of the O&G industry to scale up blue & green H2 production

Hydrogen can help tackle various critical energy challenges:

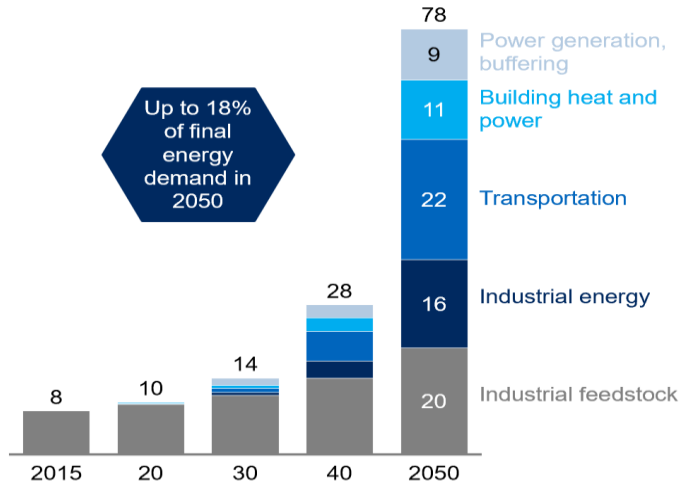
1. Meet renewable variability, storing energy.
2. Distribute energy over regions and sectors
3. Hydrogen is versatile.

Levers to scale up H2:

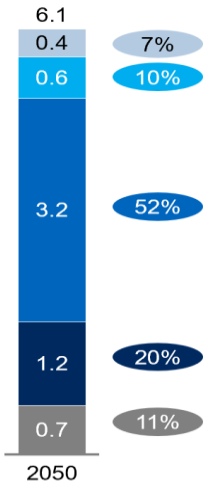
According to IEA, it notably needs

- Long term signals
- Stimulate commercial demands
- Promote R&D
- Standards development
- Integrate H2 in existing infrastructures (volatility)

Energy demand covered by hydrogen, EJ



GHG Abatement Potential by 2050, Gt CO2e / year



The O&G Industry can play a major role to (1) coordinate with OEMs, customers and policymakers to create H2 demand (2) develop or retrofit existing NG infrastructure, (3) launch pilot projects for blue H2 production and H2 powered transport corridors and (4) carry R&D to reduce blue and green H2 production costs.

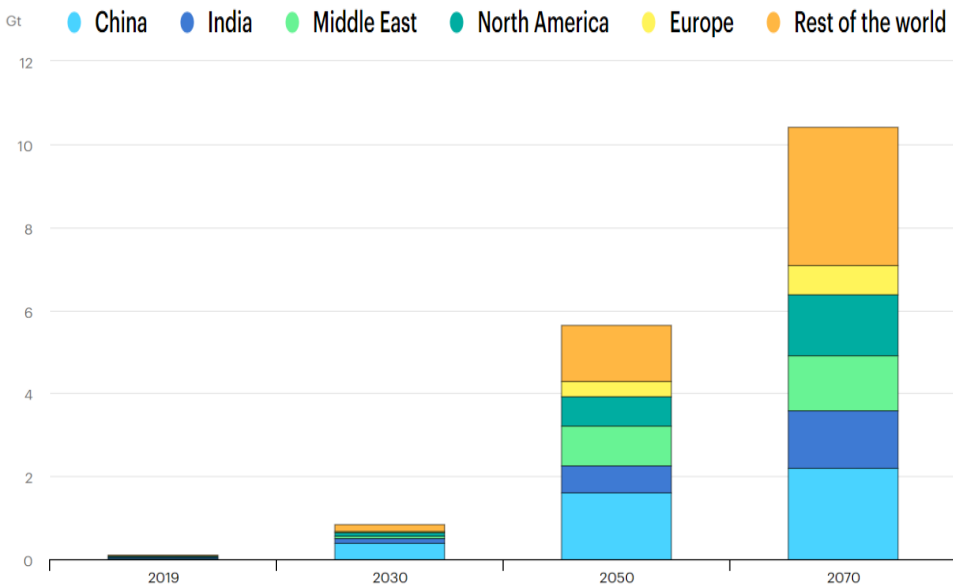
Sources: IEA, McKinsey (2019),

Role of the O&G industry to scale up the CCUS industry

Identified barriers to scale up CCUS include:

1. Lack of regional knowledge (storage, value, etc.).
2. Lack of national strategy and targets.
3. Lack of regulations (CO2 transport regulations, site characterization, subsurface MRV framework, permitting).
4. Lack of clarity of roles & responsibilities in the risk sharing/storage liabilities.
5. Lack of incentives (tax, Contract for difference, offset, etc.).
6. Lack of standard for construction, operation and injection of CO2.

Captured CO2 emissions by country/region, 2019-2070



OGCI Global CCUS Search

In an effort to scale up the CCUS industry, OGCI conducted a global search across 52 countries, to identify the next generation of potential CCUS hubs. Results highlight over 200 potential hubs identified, of which 90 with a aggregated capacity of 1 GtCO2 at a cost of <100 USD / tCO2 captured and stored.

Sources: IEA (Website, 2021), OGCI Global CCUS Search (2021)