# OGCI's efforts towards net zero

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Tuesday 23rd February 2021

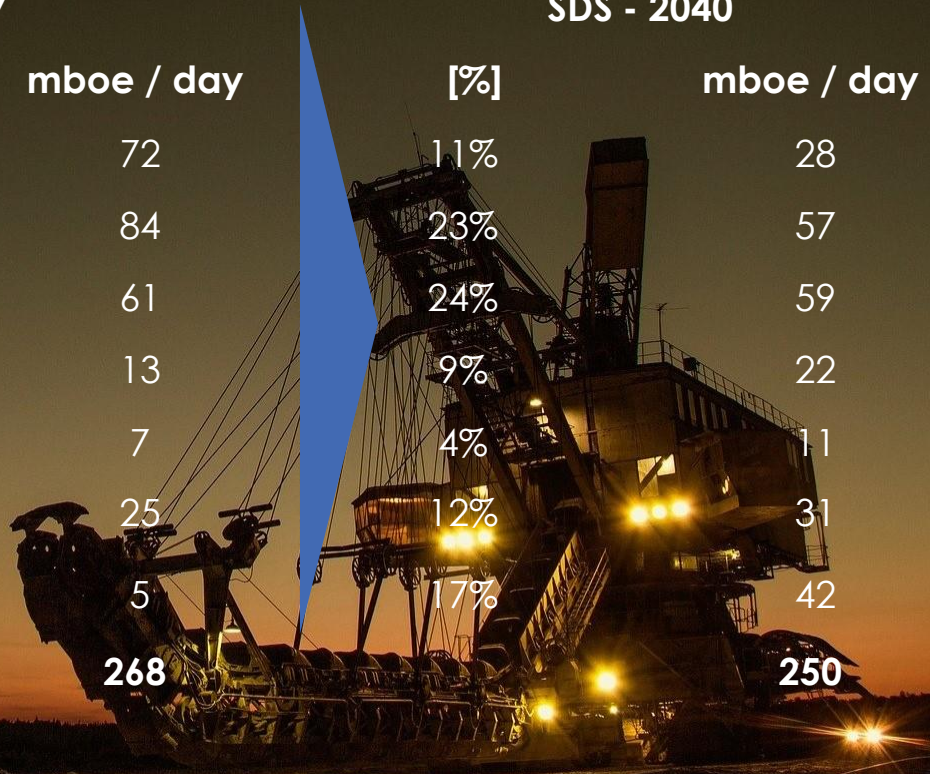
# Agenda

1. **Climate Crisis & 2021 Context**
2. **Introduction to OGCI**
3. **Circular Carbon Model**
4. **Five decarbonisation levers**
   a) Minimising methane emissions
   b) Increasing energy efficiency
   c) Enabling a sustainable transport
   d) Scaling up the CCUS industry
   e) Supporting natural climate solutions
5. **Conclusion and Q&A**

# Hydrocarbons today provide ~80% of our energy needs

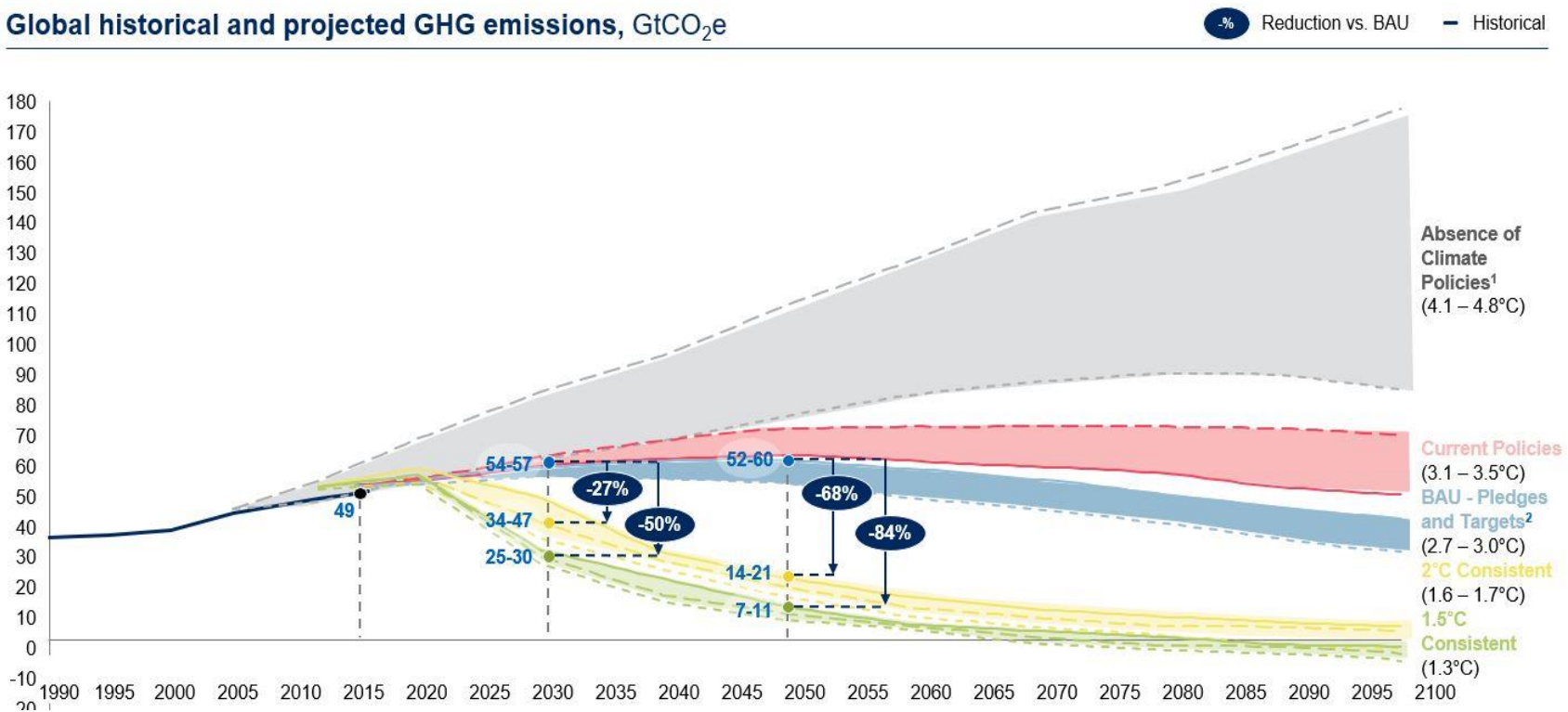
## Global Primary Energy demand by fuel

| | 2017 | | SDS - 2040 | |
|---|---|---|---|---|
| **Fuel** | **[%]** | **mboe / day** | **[%]** | **mboe / day** |
| Coal | 27% | 72 | 11% | 28 |
| Oil | 31% | 84 | 23% | 57 |
| Natural Gas | 23% | 61 | 24% | 59 |
| Nuclear | 5% | 13 | 9% | 22 |
| Hydro | 3% | 7 | 4% | 11 |
| Bioenergy | 9% | 25 | 12% | 31 |
| Other renewables | 2% | 5 | 17% | 42 |
| **Total** | | **268** | | **250** |



**Source:** IEA WEO (2019)

# GHG emissions: -68% to -84% by 2050 to reach the goals of the Paris Agreement




[1] Generally called baseline scenarios, data from the IPCC AR5 Working Group III
[2] IEA New Policies Scenario (NPS) falls in the 2.7 – 3.0°C range
**Source:** Climate Action Tracker (2019)

# Meeting 1.5°C will require near zero GHG-emission globally by 2050


**Sources:**
[1] Based on IEA New Policy Scenario (for energy-related CO2 emissions) and EU Global Energy and Climate Outlook 2018 (for other GHG emissions)
[2] Triangulation of IEA WEO SDS 2018; IEA ETP B2DS 2017; IEA ETP 2DS 2017; Shell Sky Scenario 2018; EU GECO 2018
[3] Based on EU GECO 2018

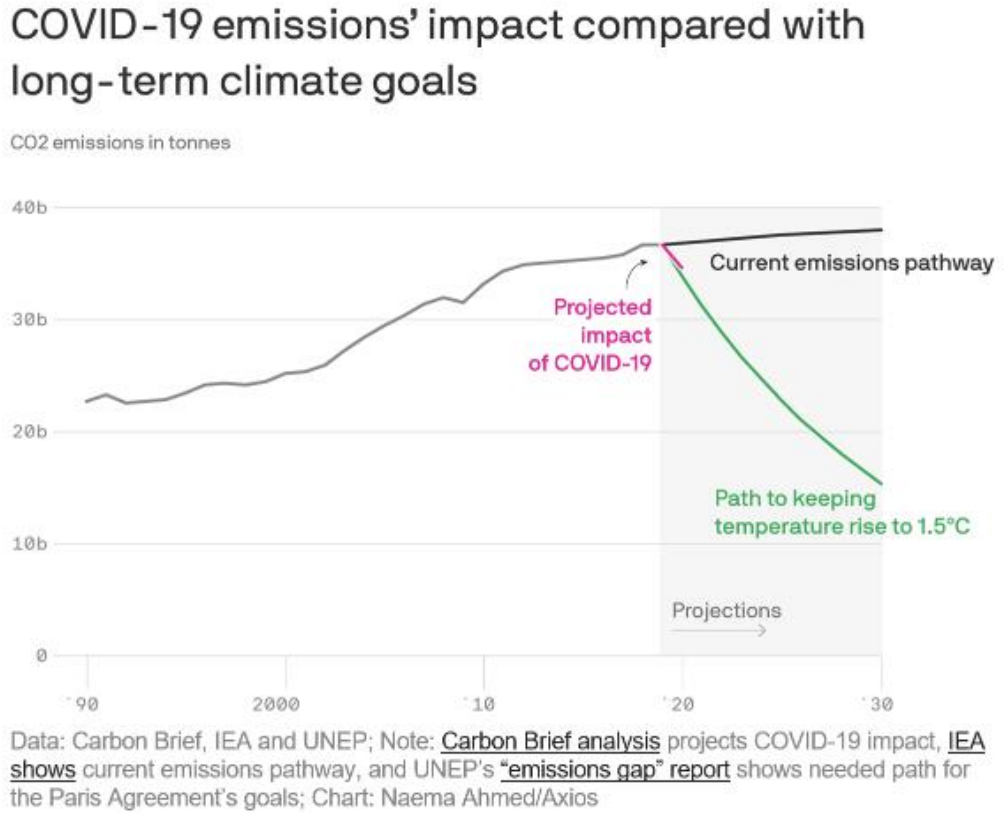
# Impact of Covid-19 on GHG emissions

According to Carbon Brief, **global GHG emissions are projected to drop 5.5% in 2020**

but

…even this is **less than what is needed to meet the goals of the Paris Agreement**.

To stay below **1.5 degrees GHG emissions would require an annual drop of 7.6%.**




**Sources:** Carbon Brief (2020), Axios Newsletter (2020)

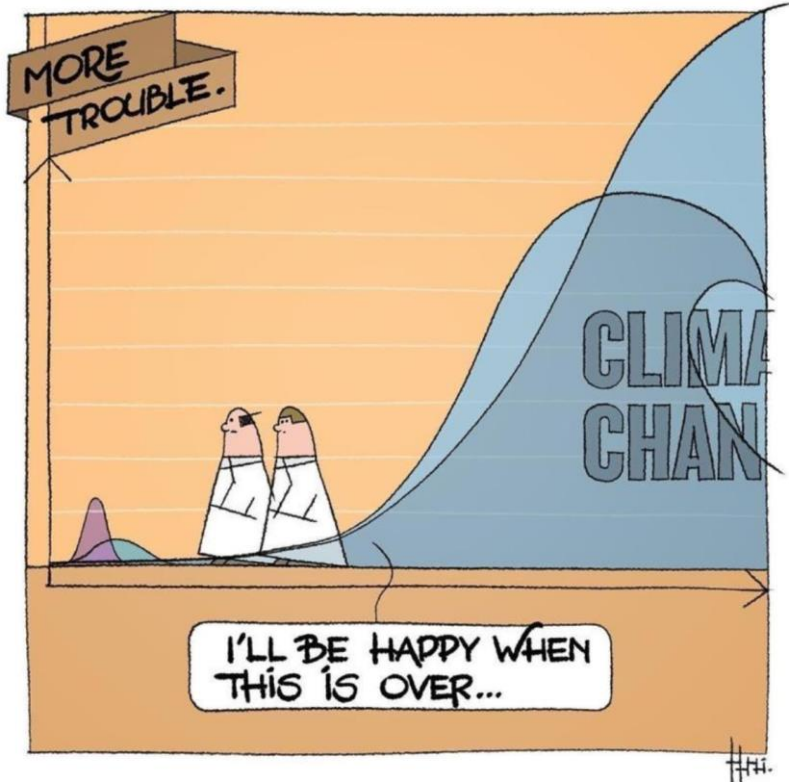
# Covid-19 & climate crises share similarities, yet are different

## Similarities

- **Global issue**
- Need for **collaborative effort** between countries & actors
- **Adverse economic impact**
- **Social & economic cost**
- **Affecting livability** of the planet
- Disrupting **human living standards**

## Differences

- **Timescale** (short term vs long term)
- **Economic Impact** (USD 1 Trillion vs USD 600 Trillions)
- **Preparedness** (Climate change is expected to happen)
- **Impact on jobs** (Climate change can provide an opportunity for job creation)



# Climate ambition has been accelerating in the past 12 months

**June 2020**
- Under UN Banner
- 1391 business, 454 cities, 74 investors, 23 Regions
- Bring together under a unique campaign program a number of existing coalition taregtting net zero goal, including (not exhaustive)
  - ✓ 2050 Pathways Platform
  - ✓ Certified B Corporation
  - ✓ Business Ambition for 1.5 C - Our Only Future
  - ✓ Net-Zero Asset Owners Alliance
  - ✓ Science Based Targets
  - ✓ Under2Coalition
  - ✓ We Mean Business Coalition
  - ✓ World Business Council For Sustainable Development

WBCSD raises the bar for sustainable business leadership

Global leading businesses, united in WBCSD, vote for the adoption of new membership criteria to accelerate the transformation to a sustainable world in the decade ahead

**Oct 2020**
- 200 companies
- Supported by large majority new membership criteria
- Include « Set an amition ot reach net zero GHG emissions, no lated than 2050 and have a science-informed plan to achieve it

Climate Action Tracker

PUBLISHED 2020/12/01

Global update: Paris Agreement Turning Point

**Dec 2020**
- *"In total, **127 countries**, responsible for around 63% of emissions are considering - or have adopted, net zero targets."*
- *"If all national governments meet their 2050 net zero emissions targets, warming could be **as low as 2.1˚C by 2100**, putting the Paris Agreement's 1.5˚C limit within striking distance."*

S&P Global Market Intelligence

1/3 of the largest O&G companies in Europe and North America have set net-zero targets by 2050

wbcsd

*BP, Chevron, ENI, Equinor, Petronas, PTT, Shell, Total*

WE MEAN BUSINESS COALITION

SCIENCE BASED TARGETS

*1,156 companies set emissions reduction targets through the Science Based Targets initiative (SBTi)*

2015 2016 2017 2018 2019 2020 2021

# External pressure on industry & energy player reveals numerous challenges & opportunities, to be orchestrated to switch to a new model

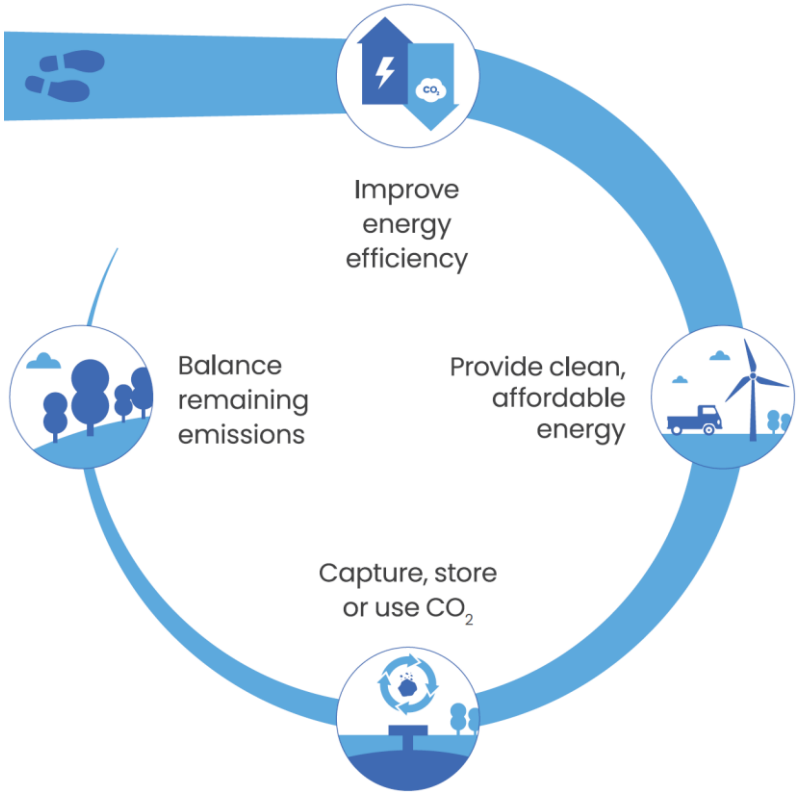
## Challenges

- Putting a **value on carbon emissions**
- **Trust** from stakeholders
- **Energy Efficiency** rate of improvement
- **Natural climate solutions** & the role of carbon offsets
- **CCUS** At scale
- **Hard to abate sectors** (marine, HDV, aviation, heavy industry)
- **Youth Engagement** & attractiveness of the industry
- **SDGs** & net positive impact
- **Regulatory enablers** to create value out of solutions

## Opportunities

- **Coal to gas switch** globally & **oil to gas switch** across transport
- Elimination of **global methane leakage** & **gas flaring**
- **Reducing primary biomass in Africa**
- Roll out **renewables at scale** in combination with natural gas
- Accelerated **move to EV's & Hybrids** in urban fleets
- Enhanced **power storage** & **demand response programmes**
- **Shift to prosumer,** able to generate and manage its own energy system
- Significant **forest regeneration** and **biodiversity protection**
- Collective **R&D push on CCS & H2** to test applicability at scale

# How to seize those opportunities in a structured fashion? Introducing the Carbon Circularity Concept




## Old Model

Oil & Gas companies conducting business in a linear, logical sequence of operations:

*Production ➔ Transformation ➔ Distribution*

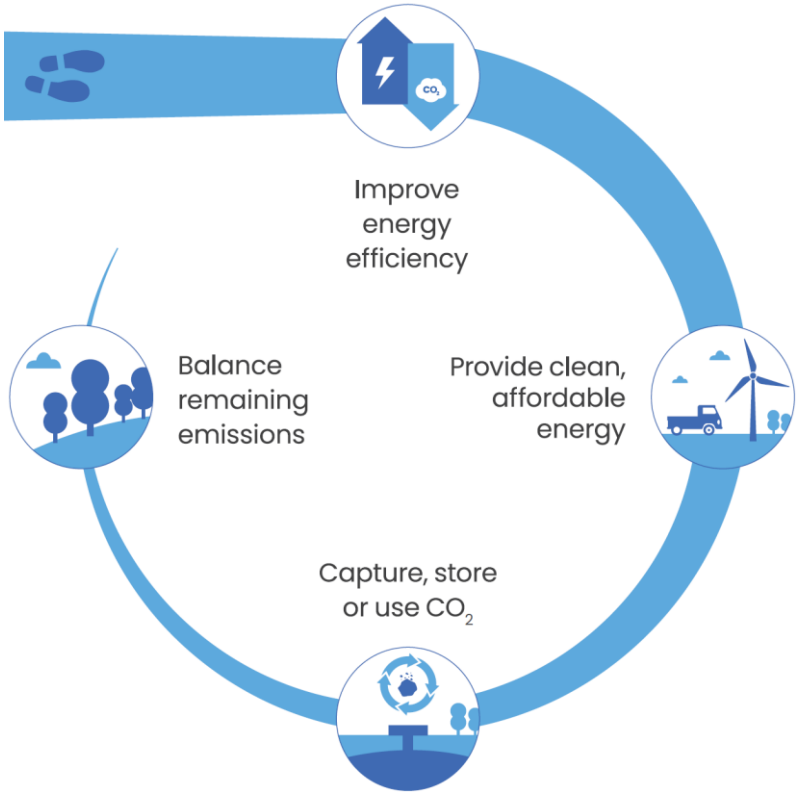
In a market that can absorb infinite amounts of carbon-based products.

## New Model

Energy companies guiding their customers towards the energy transition, by helping them manage their energy requirement all along the life cycle while optimizing impacts of the energy products consumed.

➔ *The circular carbon model*

# Carbon circularity as a framework to enhance competitive advantage




## Circular Carbon Model

1. Offering customers (both industrial & private) with energy efficiency / climate footprint reduction services becomes a prerequisite to selling energy products.
   ***E.g.*** *increasing energy efficiency of Internal Combustion Engines.*
2. Energy provided should prove its virtues as being low-carbon. Carbon intensities & labels can inform customers on the choices they are making.
   ***E.g.*** *Sustainable natural gas label; renewable energy.*
3. Energy companies can optimize and share energy management with customers.
   ***E.g.*** *Prosumer & integrated solutions.*
4. Energy companies can valorise impact by managing / recycling waste (heat, fatal power & GHG emissions) on behalf of its customers.
   ***E.g.*** *Net Zero Teesside project in the UK, managing emissions from a gas fired powerplant.*
5. For emissions that cannot be avoided, energy companies can support customers in offsetting their remaining carbon emissions.
   ***E.g.*** *Shell Go+ offsetting programme.*

**Source:** Shell (2019)

# Strategic Opportunities: Resources & Capabilities of the industry

## Challenges

- Putting a **value on carbon emissions**
- **Trust** from stakeholders
- **Energy Efficiency** rate of improvement
- **Natural climate solutions** & the role of carbon offsets
- **CCUS** At scale
- **Hard to abate sectors** (marine, HDV, aviation, heavy industry)
- **Youth Engagement** & attractiveness of the industry
- **SDGs** & net positive impact
- **Regulatory enablers** to create value out of solutions

## How the industry can contribute?

- **Long term vision**
- **Global footprint**
- **Patient capital**
- **Technical expertise**
- **Understanding of the challenge** and Engagement
- **Complex Project Management**
- **Multi stakeholder approach**
- **Collective effort** beyond individual company effort
- **Mechanism** for co-investment and risk-sharing

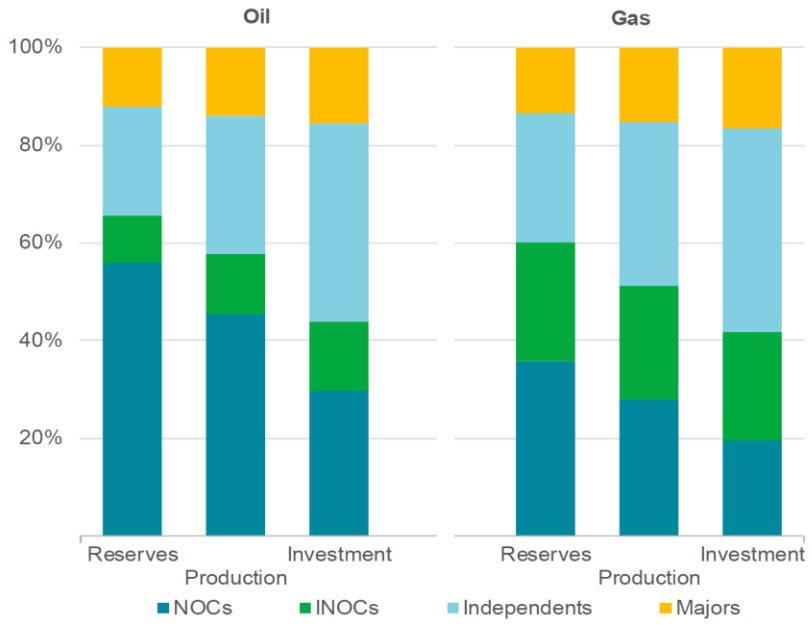
# Collaborative action between IOCs and NOCs

## International Oil Companies (IOCs) are playing a leadership role in the energy transition:

- Global geographical footprint
- Long history of non-financial reporting disclosure
- Involvement in multiple JVs with NOCs
- Wide reaching regional and global stakeholder engagement, including public investors
- Strong branding

**But they can only be impactful if National Oil Companies, accounting for the majority of oil and gas production, also take a leadership role towards net zero emissions**

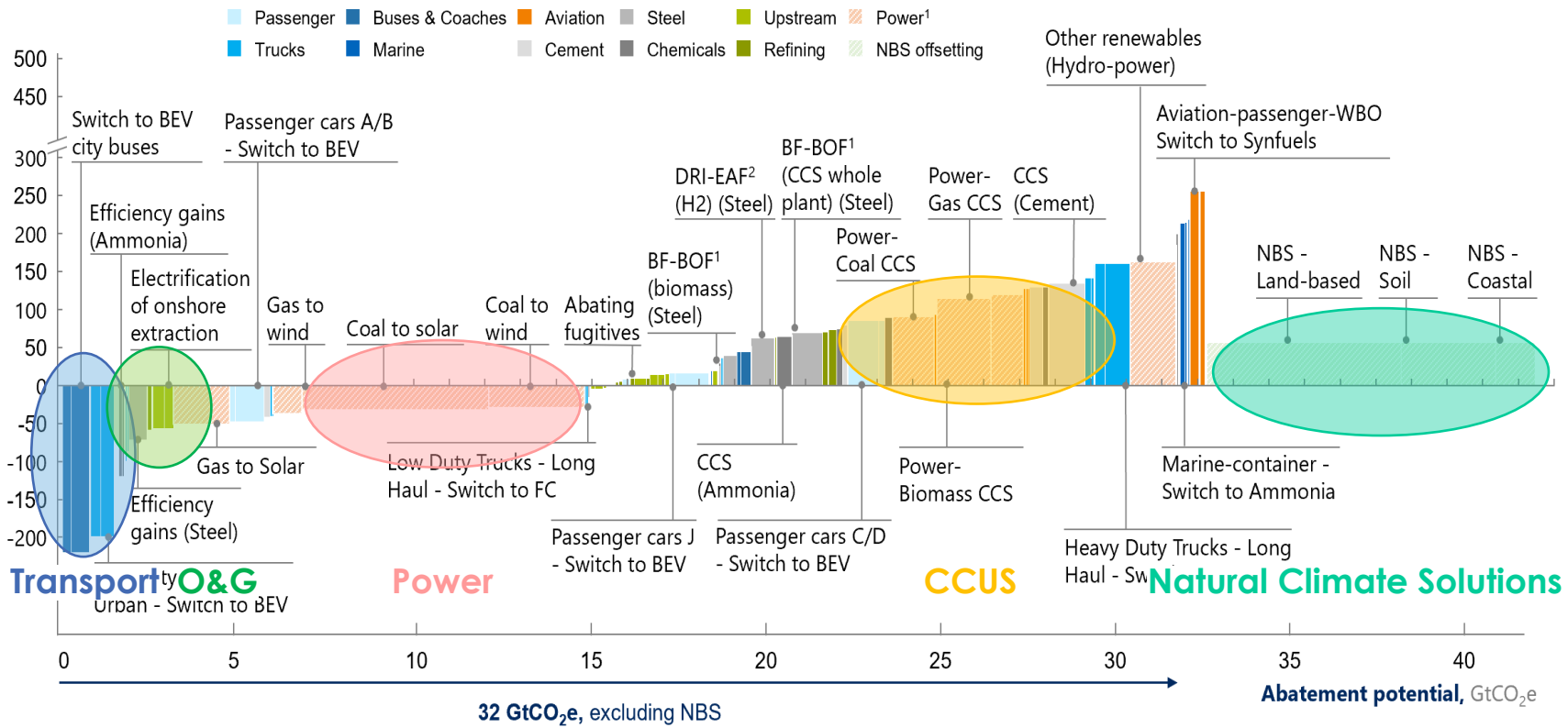
## Ownership of oil and gas reserves, production and upstream investment by company type, 2018




**Source:** IEA (2020)

# Technology Solutions & decarbonisation levers in a 1.5C scenario

## Marginal Abatement Cost Curve solving for a 1.5C in 2050 (USD/TCO2)




**1** Blast Furnace (BF) to Basic Oxygen Furnace (BOF) **2** Direct Reduced Iron (DRI) in the Electric Arc Furnace (EAF)
**Source**: McKinsey GHG Assessment Proprietary Tool

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# 2.1) Deep dive on methane emissions reduction in the O&G industry

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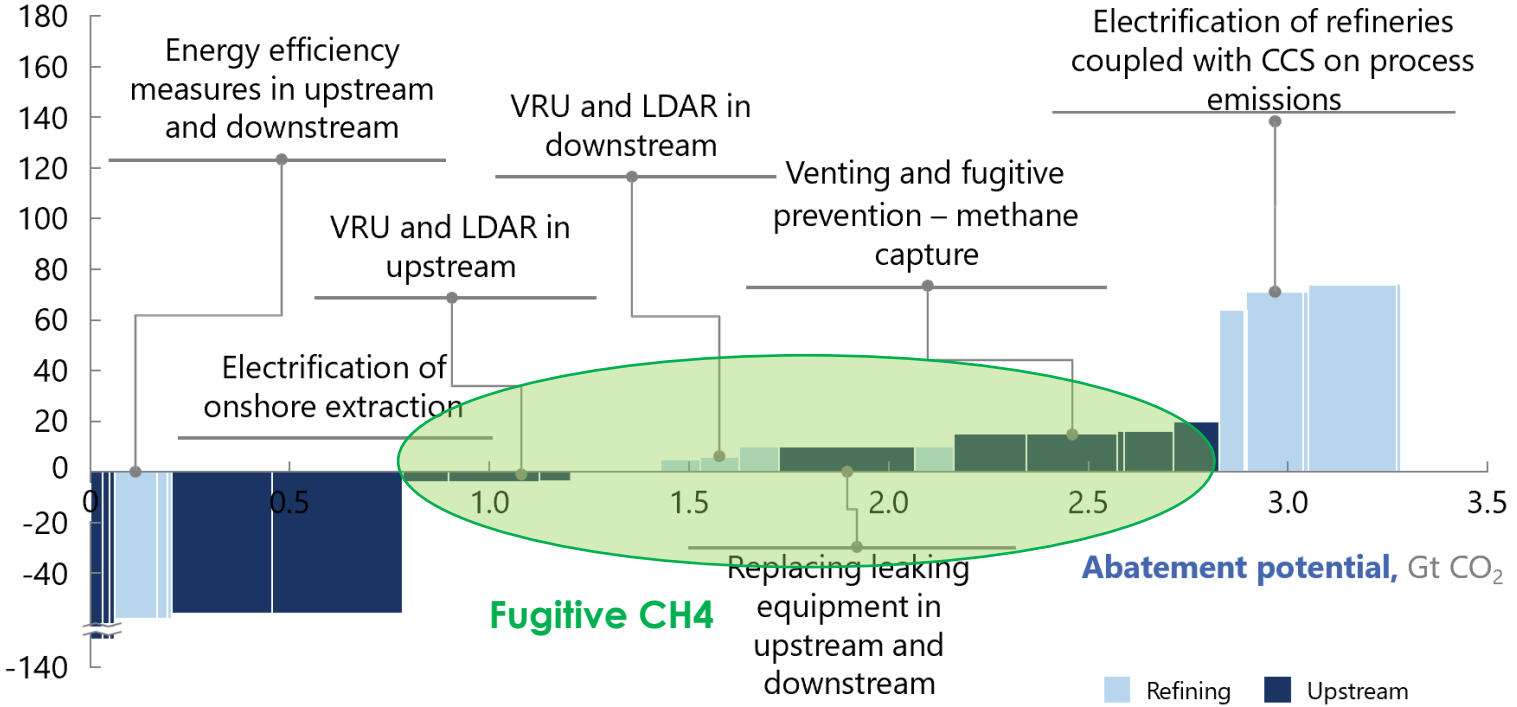
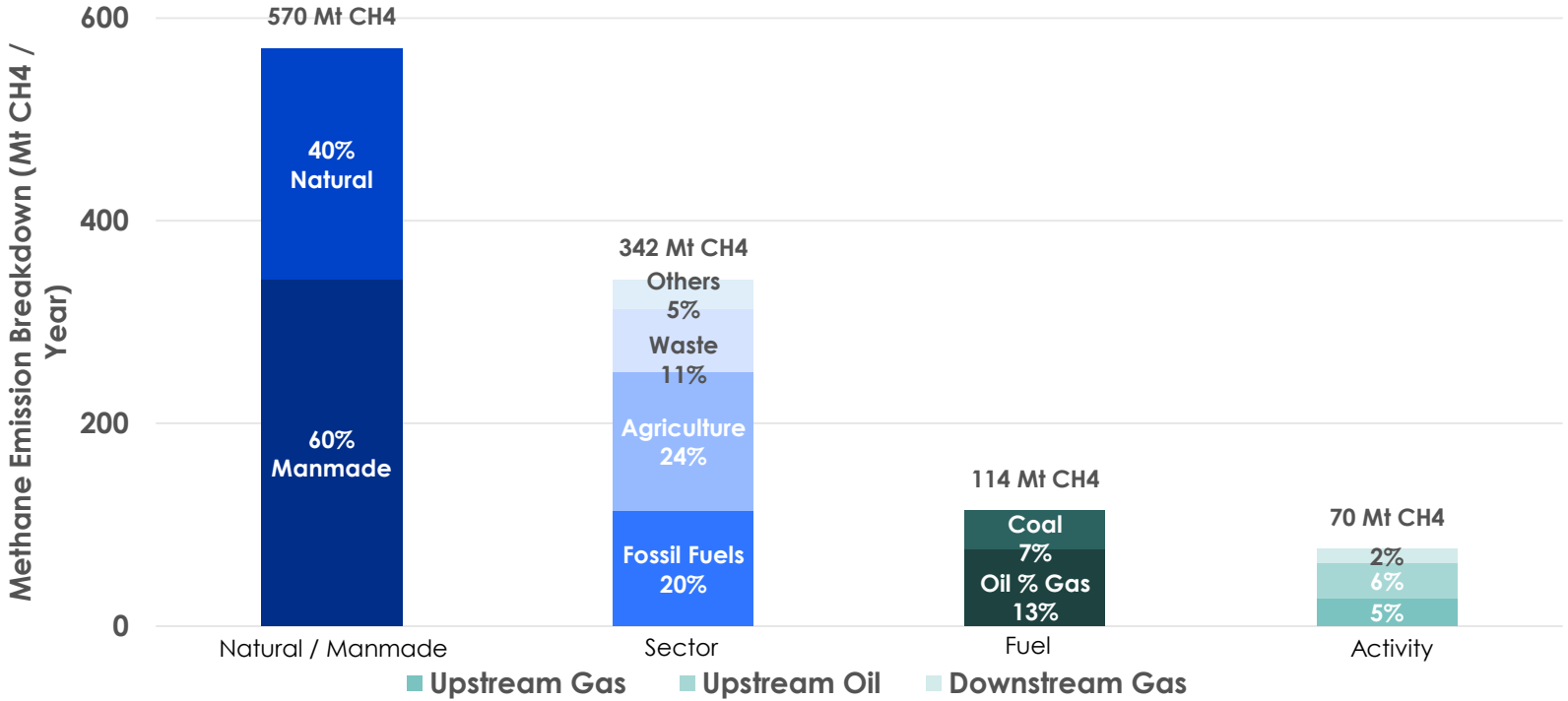



Source: McKinsey GHG Assessment Proprietary Tool

# Deep dive on Methane Emissions Reduction in the O&G industry

## IPCC estimates that to date, methane emissions accounted for ~25% of total global warming

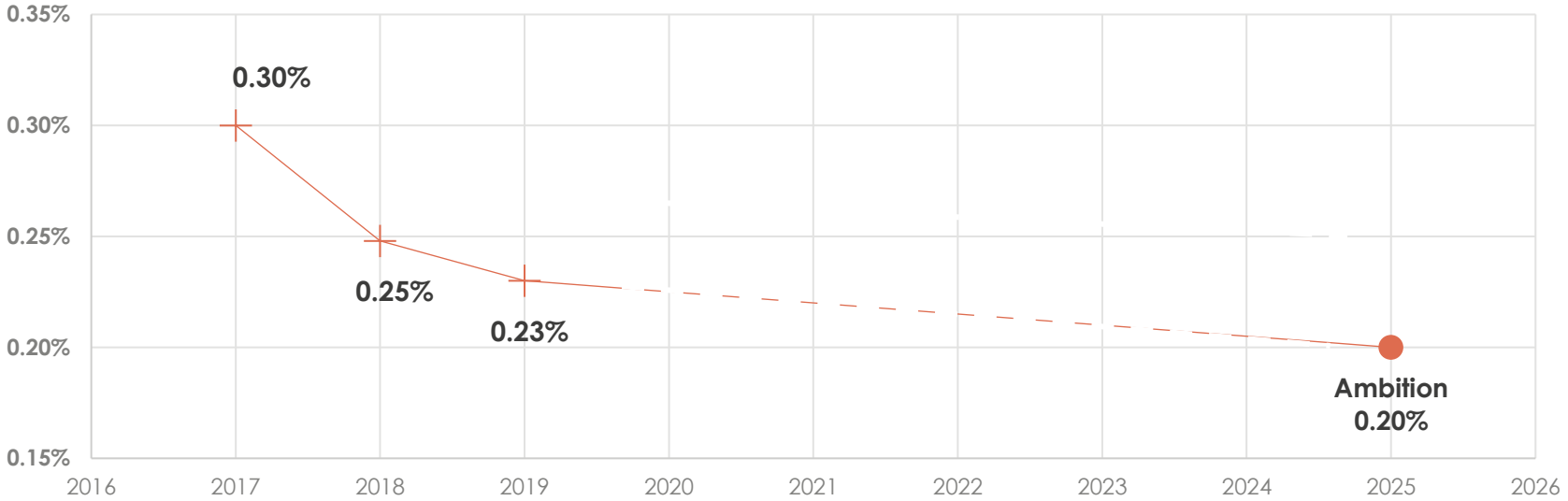



**Source:** IEA WEO (2017)

# Setting a strategic target to reduce methane emissions

## OGCI Announcement

*"An ambition to reduce by 2025 the collective average methane intensity of OGCI member companies' aggregated upstream gas and oil operations by one third to achieve 0.20%."*



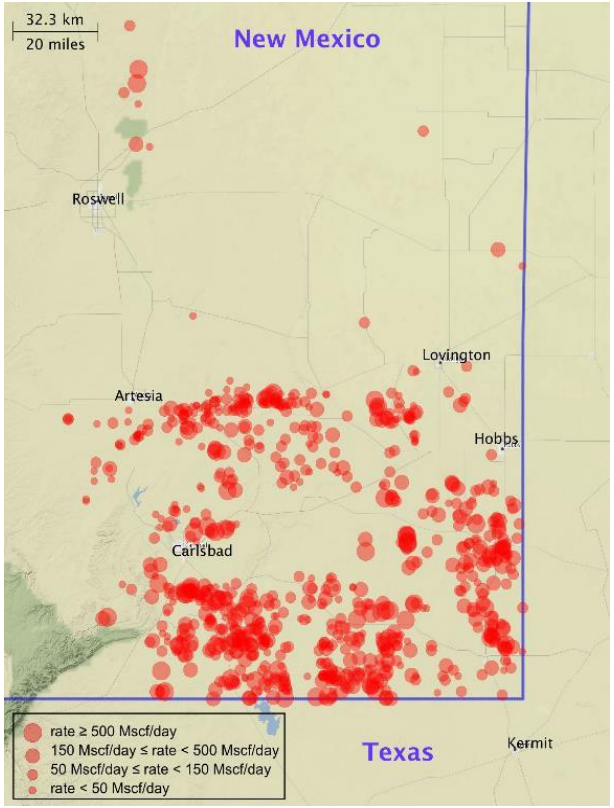

**Source:** OGCI Press Release (2020), OGCI Progress Report (2020)

# Emerging detection & quantification technologies

**3% of global natural gas production is lost each year, representing a $30B economic opportunity.**

**Example of Kairos Aerospace** offering large-scale, cost-effective aerial surveys of Oil & Gas sites to detect and measure methane emissions.

In 2019, Kairos fly overs allowed early identification **of 2 Million Tons CO2e** from being released in the atmosphere, **worth USD 3M**.




**Sources:** K. Larsen et al. (2015), Kairos Aerospace (2019)

# Energy Efficiency & Electrification - Technology solutions mapped with MACCs

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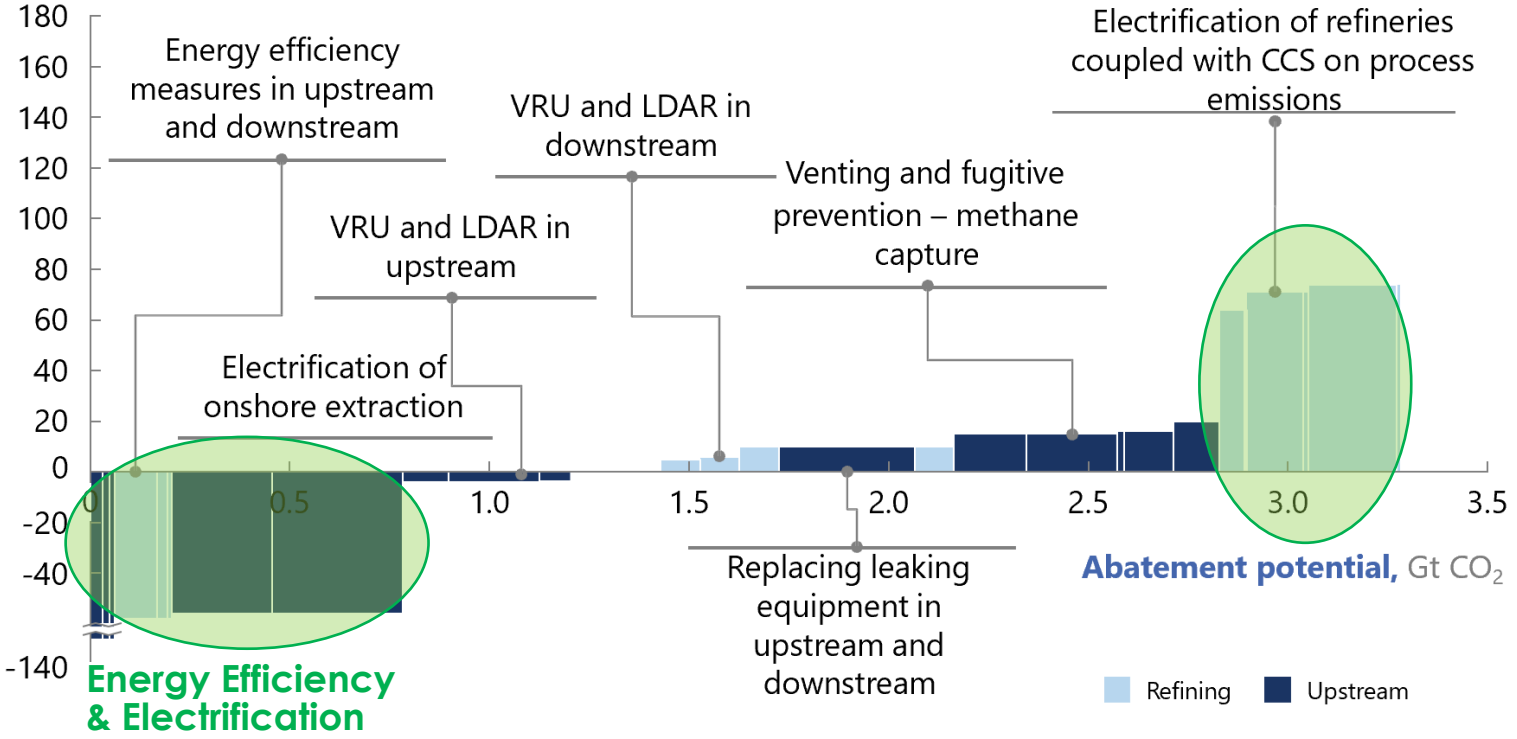


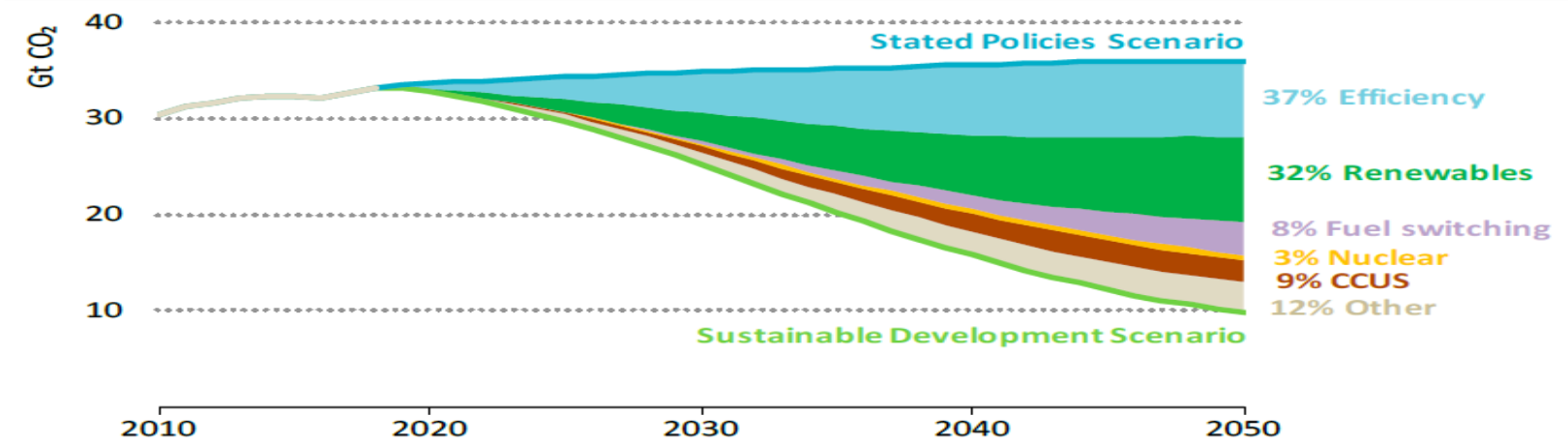

**Source:** McKinsey GHG Assessment Proprietary Tool

# Energy Efficiency & Electrification in the O&G industry

## Energy Efficiency

*"The first fuel of a sustainable global energy system" (IEA)*

**Figure 2.16 ▷ $CO_2$ emissions reductions by measure in the Sustainable Development Scenario relative to the Stated Policies Scenario**

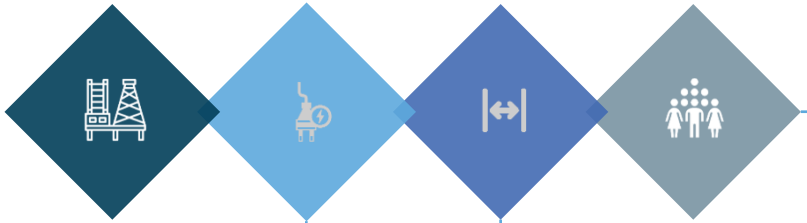



*All clean energy technologies are needed in the Sustainable Development Scenario; energy efficiency is the main contributor to emissions savings to 2050*

*World Energy Outlook 2019*

# Energy Efficiency & Electrification in the O&G industry

## 4 pillars to improve the Energy Efficiency in the O&G industry



Technological Opportunities

Electrification roadmap in the O&G Industry

Mind-set change in Energy Efficiency

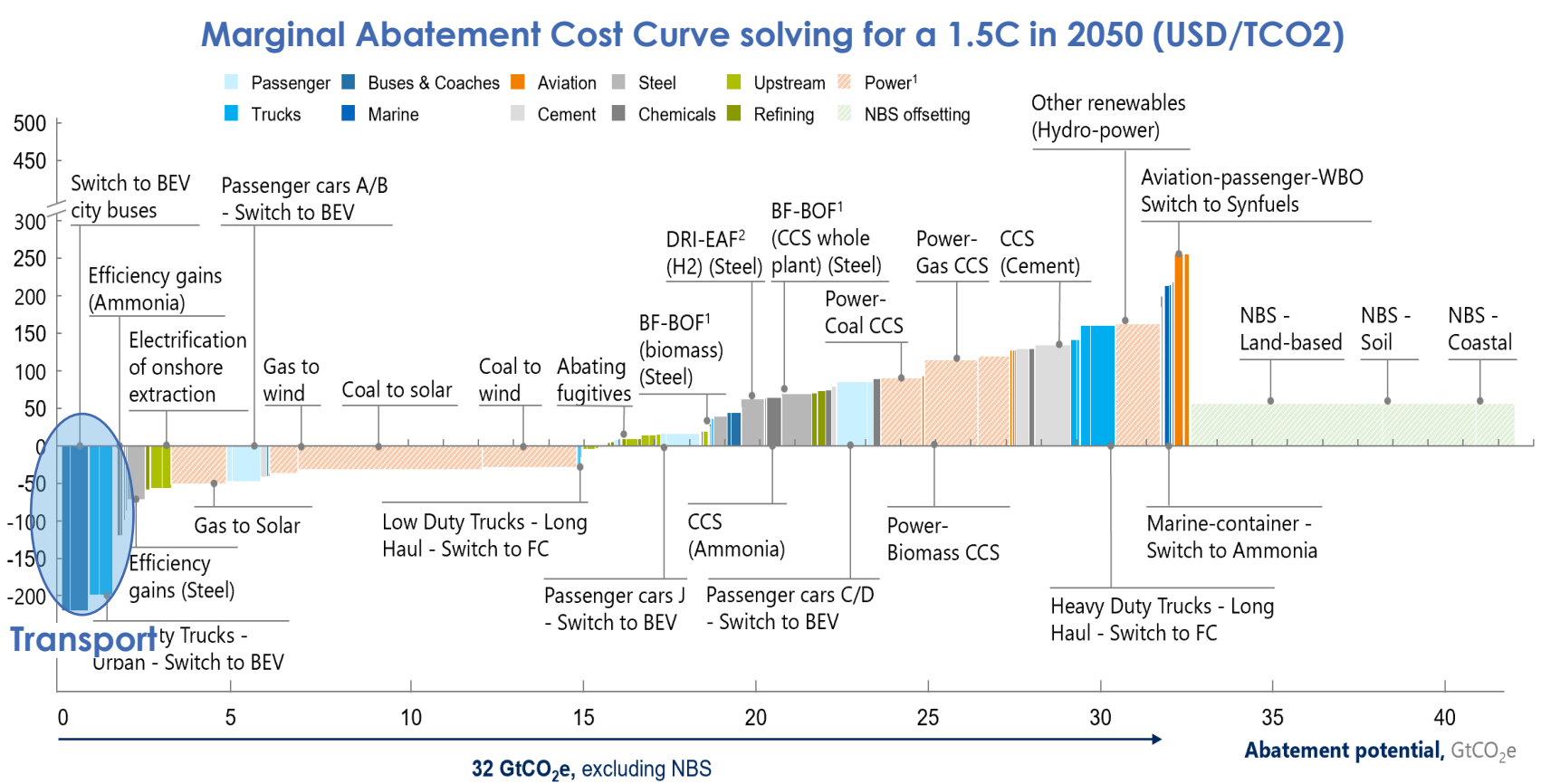
Knowledge Sharing

Best Practices Sharing

Decarbonization through Electrification

Rethinking Energy Management

# Transport - Technology solutions mapped with MACCs

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**Source**: McKinsey GHG Assessment Proprietary Tool

# Rationale for Climate Action in Transport

## More than 1.2B vehicles already on global roads

*Even **modest reductions** in the GHG footprint of market fuels delivered through existing infrastructure can make **a substantial impact** on global emissions, **without requiring new vehicles** and **infrastructure** to be deployed*

## Not all transport sub-sectors can be easily or economically electrified

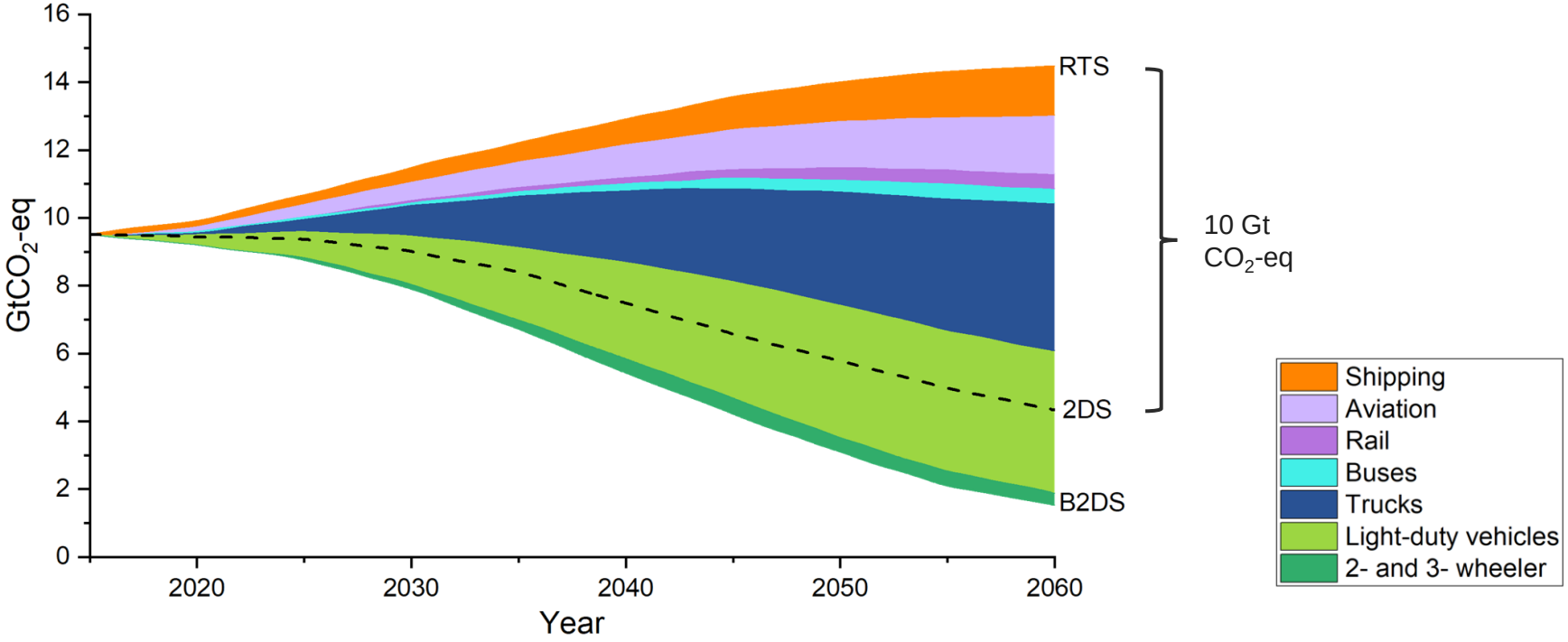
*Even in the **medium to long term**, there will still be modes of transport that require liquid fuels. **Deep-sea shipping** and **international aviation** are two **hard-to-abate** sectors with **few viable alternatives** to low carbon liquid fuels*

## Promising transport fuels such as hydrogen offer synergies with CCUS efforts

***Blue hydrogen** produced with **CCUS – another priority** – could deliver a volume impact on the **cost and availability** of **hydrogen for use in transport**, particularly in the short term*

# Scope of the Challenge

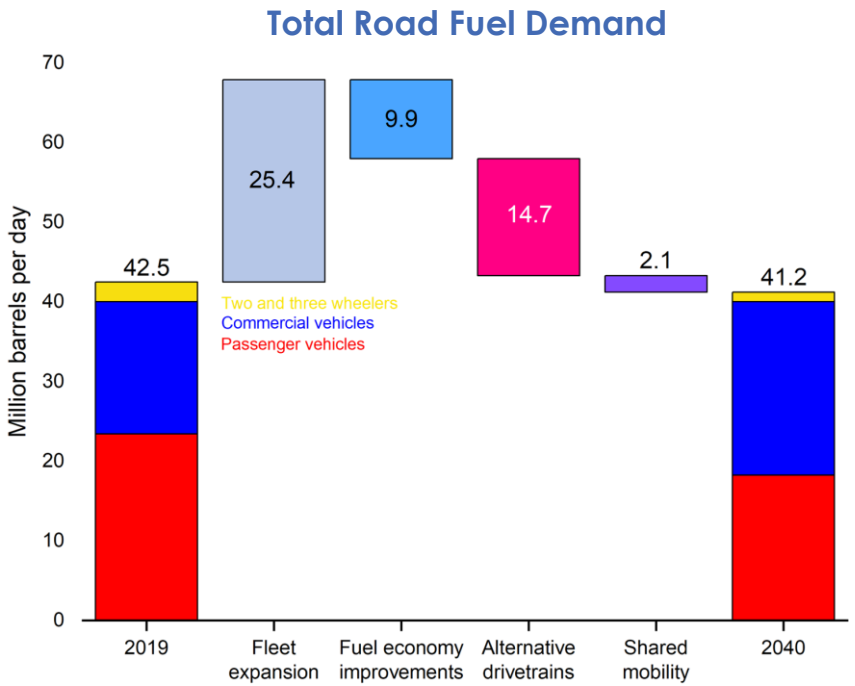
## Well-to-wheel GHG emissions reductions by transport mode and scenario, 2015-2060

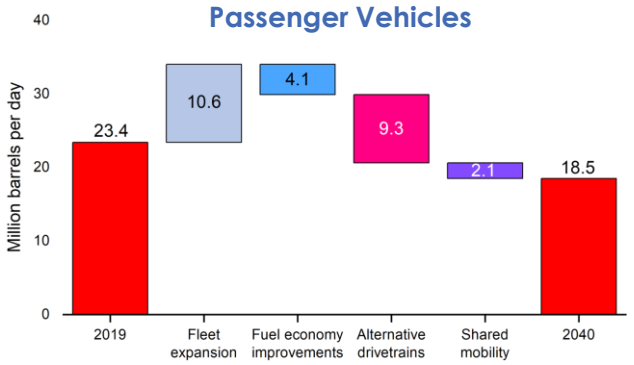


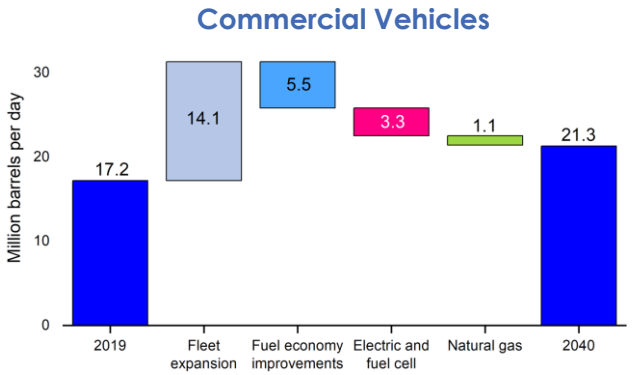

**Source**: OECD/IEA (2017a)

# BNEF: Change in Road Fuel Demand 2019 – 2040

## Demand expected to remain robust to 2040 at ~40 mb/d (incl. biofuels)

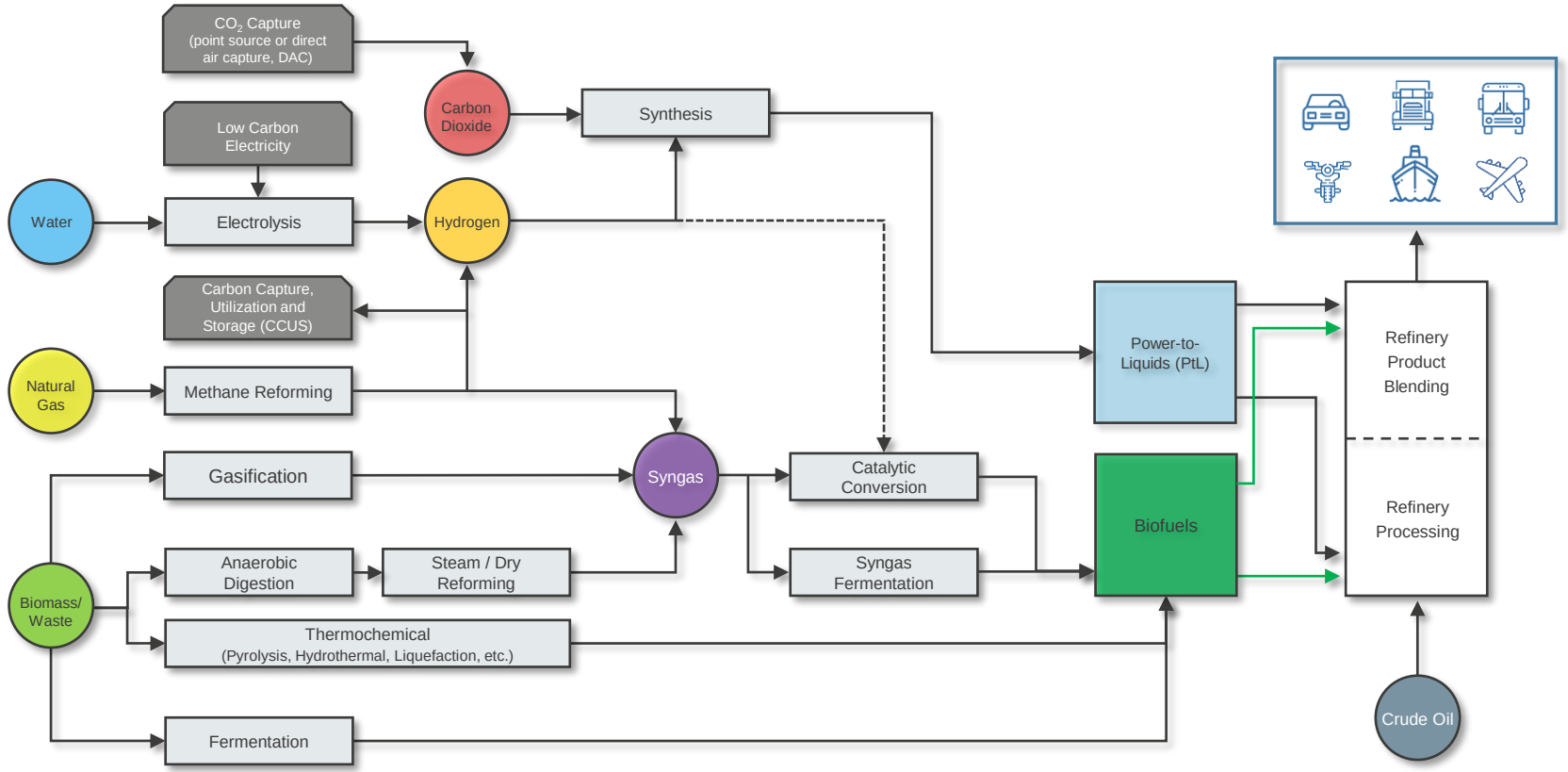


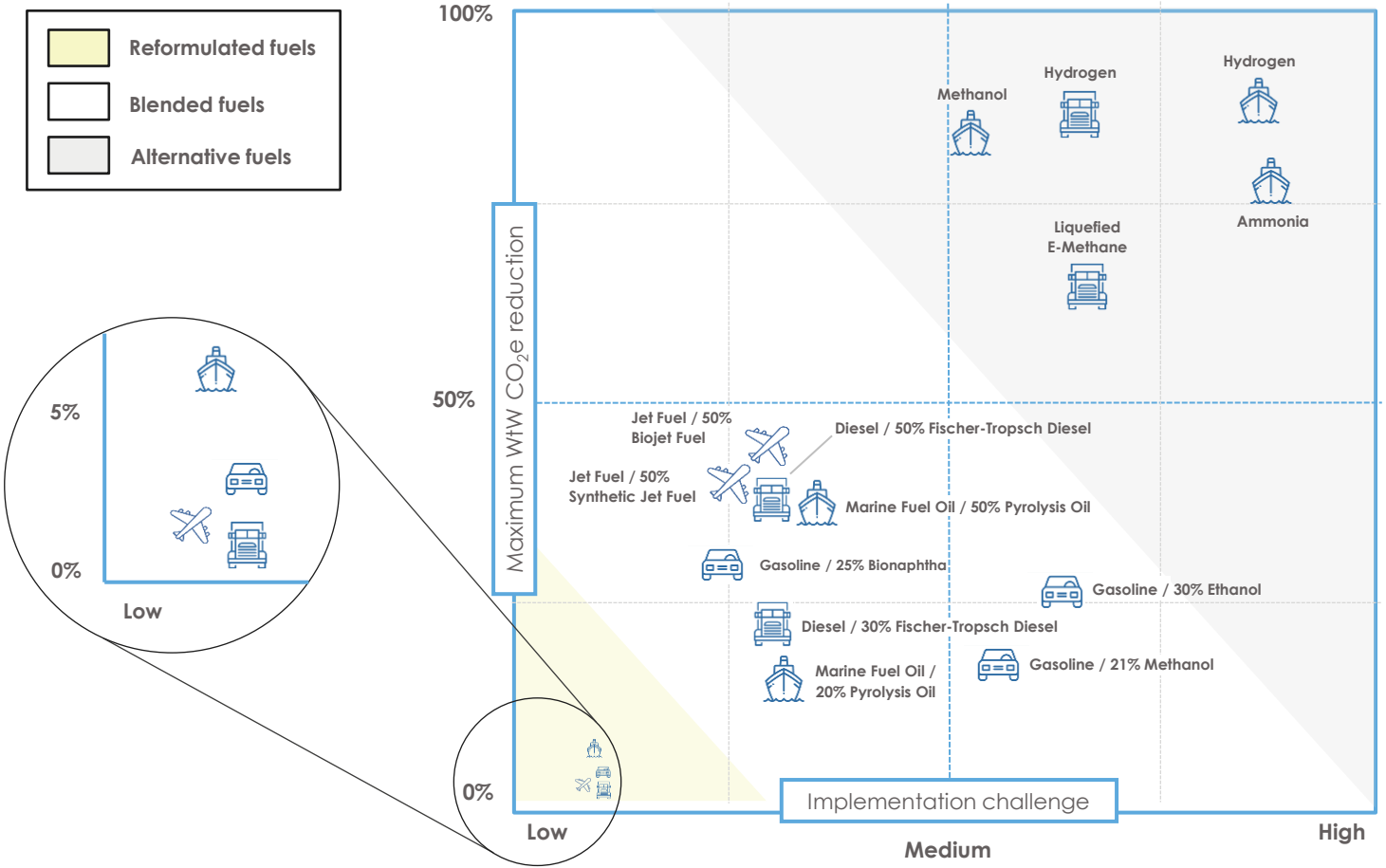

**Source: BloombergNEF, Oil and the Outlook for Road Fuels, July 2020**

# Low Carbon Liquid Fuel Production Pathways

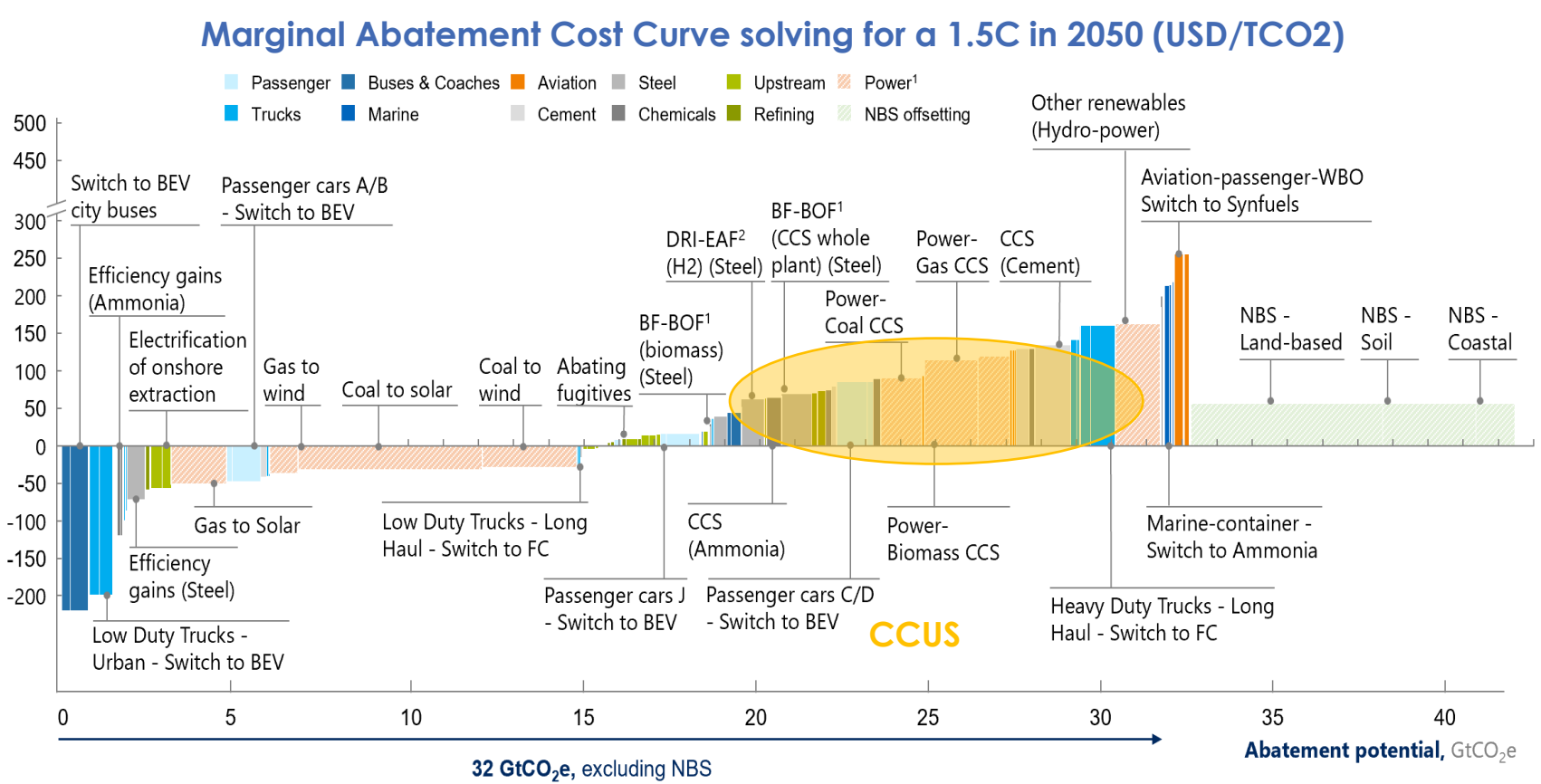



**Concept adapted from: The Royal Society (2019) Sustainable synthetic carbon-based fuels for transport, Policy Briefing**

# Maximum WtW $CO_2$ Reduction vs. Implementation Challenge



# CCUS - Technology solutions mapped with MACCs

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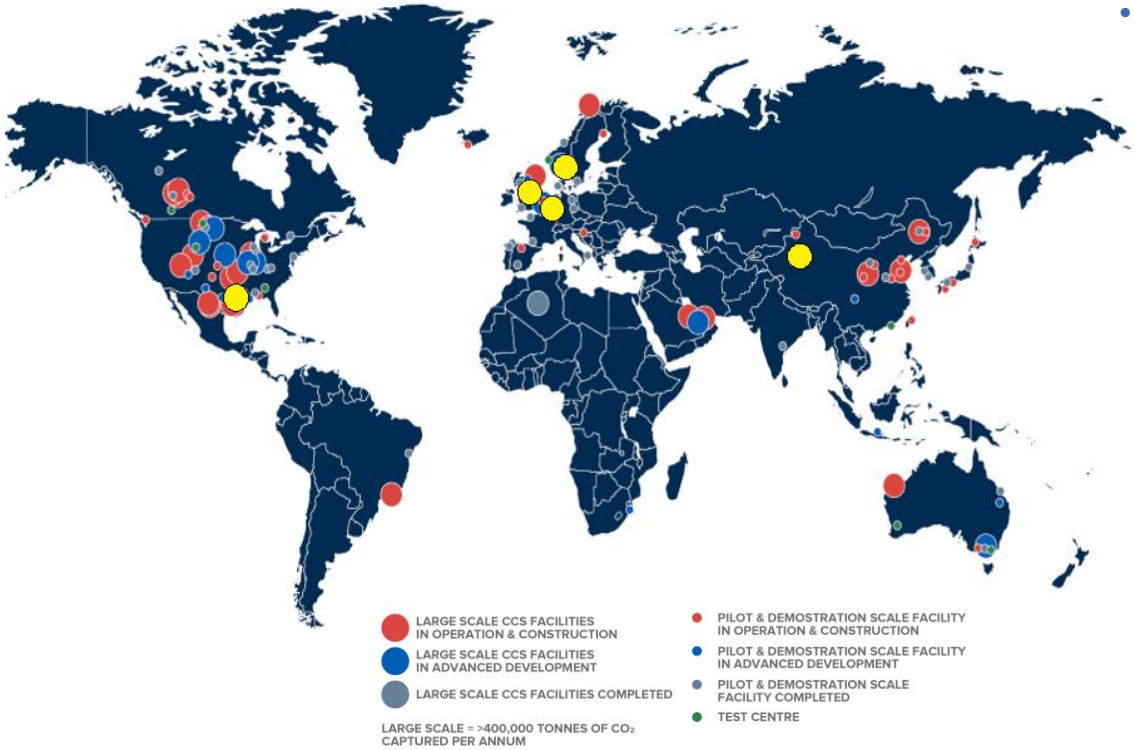
**Source**: McKinsey GHG Assessment Proprietary Tool

# Global status of CCUS facilities




- **65 commercial CCS facilities** globally:
  - 28 in operation,
  - 3 under construction
  - 34 in various stages of development.

Resulting in **40 Mt CO2** captured and stored per year in 2020.

Meeting a well-below 2°C scenario would require multiplying existing capacity by:

**x30** by **2030**
**x100** by **2040**

**Sources:** GCCSI (2020), IEA (2020)

# OGCI's effort to kickstart the CCUS industry


## Objective

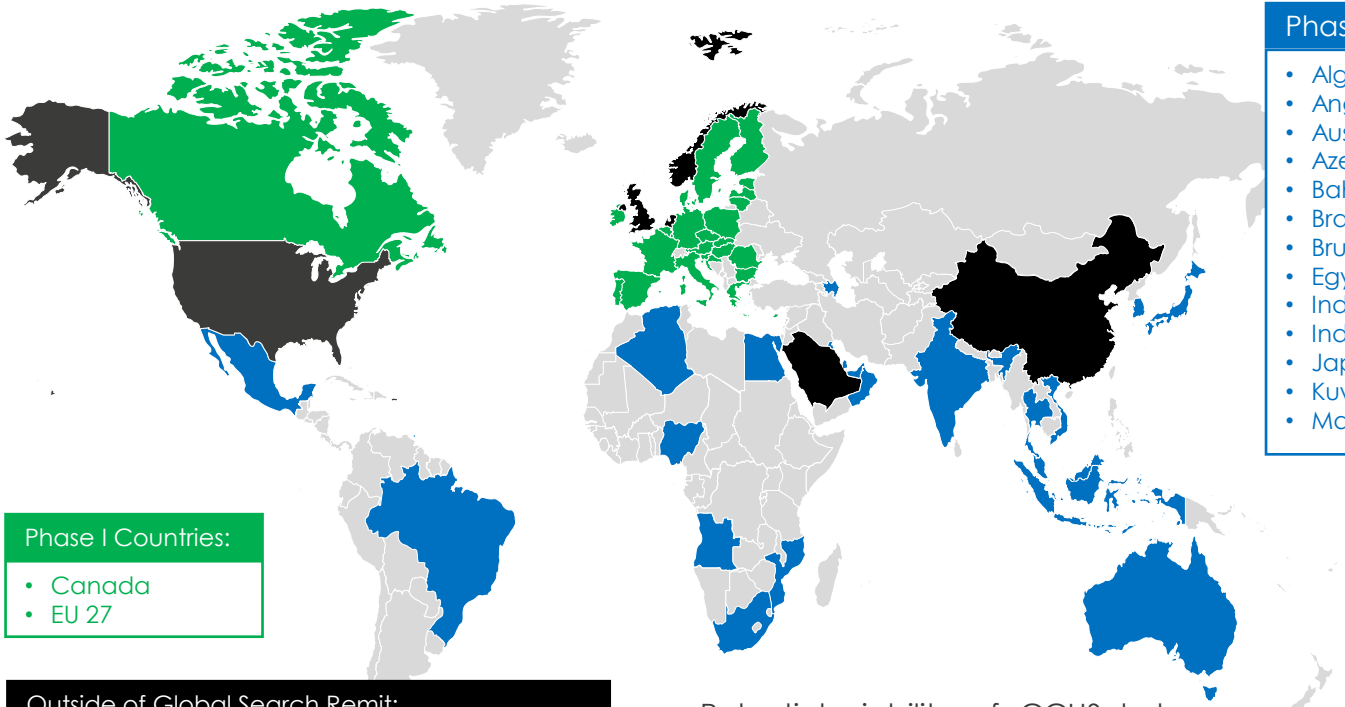
- Play a part in the emergence of a commercially viable, safe and environmentally responsible CCUS industry.
- Help facilitate large scale commercial investment in CCUS.
- Bring stakeholders together to enable multiple low carbon industrial hubs.

## Hubs' Industrial Characteristics

- Biomass power
- Gas power
- Waste incineration
- Fertilizers
- Petrochemicals
- Hydrogen
- Cement
- Steel
- Aluminium
- Refineries
- $CO_2$ imports

**Source:** OGCI (2020)

# Introducing KickStarter Global CCUS Hub Search



**Phase I Countries:**

- Canada
- EU 27

**Phase II Countries:**

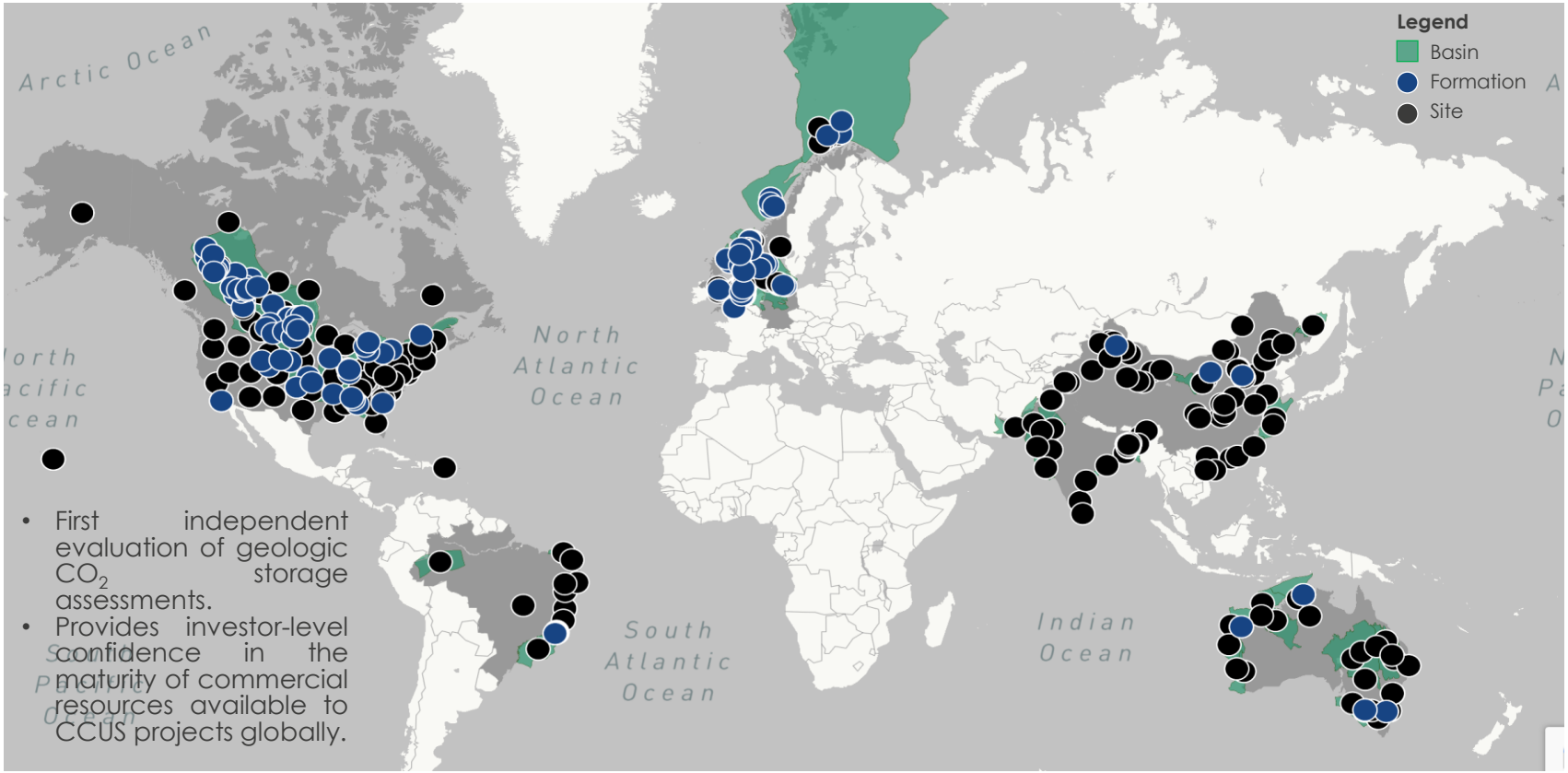
- Algeria
- Angola
- Australia
- Azerbaijan
- Bahrain
- Brazil
- Brunei
- Egypt
- India
- Indonesia
- Japan
- Kuwait
- Malaysia
- Mexico
- Mozambique
- Nigeria
- Oman
- Qatar
- Singapore
- South Africa
- South Korea
- Trinidad and Tobago
- Thailand
- UAE
- Vietnam

**Outside of Global Search Remit:**

- China
- The Netherlands
- Norway
- Saudi Arabia
- UK
- USA

Potential viability of CCUS hubs was assessed through a geo-analytical clustering of emissions and storage sources, a techno-economic basis and estimated costs through the full value chain (capture –transport –storage) together with a qualitative overlay.

# CO2 Storage Resource Catalogue




**Source:** OGCI (2020)

# CCUS in practice: emerging archetypes for deployment

## CCUS Project Archetype n.1
### Anchor project

Develop a first project in an industrial cluster, designed with right-sized Transport & Storage (T&S) capacity to bring other emitters into a shared T&S infrastructure hence sharing associated costs & risks.

### E.g. Net Zero Teesside (UK)


## CCUS Project Archetype n.2
### Develop inter-regional T&S network

Developing versatile Transportation & Storage (T&S) to meet inter-regional demand can incentivise emitters to decarbonise even without direct connection to the hub.

### E.g. Northern Lights (Norway)

# CCUS in practice: long term archetypes for deployment

**Supply side of new low-carbon energy products can drive CCUS deployment.**

## CCUS Project Archetype n.3
### Enable new markets

CCS can enable sustainable production of blue hydrogen, with potential in the long term to help decarbonise industry (energy & feedstock), transportation and building heat and power sectors.

**E.g. Rotterdam (The Netherlands)**


## CCUS Project Archetype n.4
### Achieve negative emissions

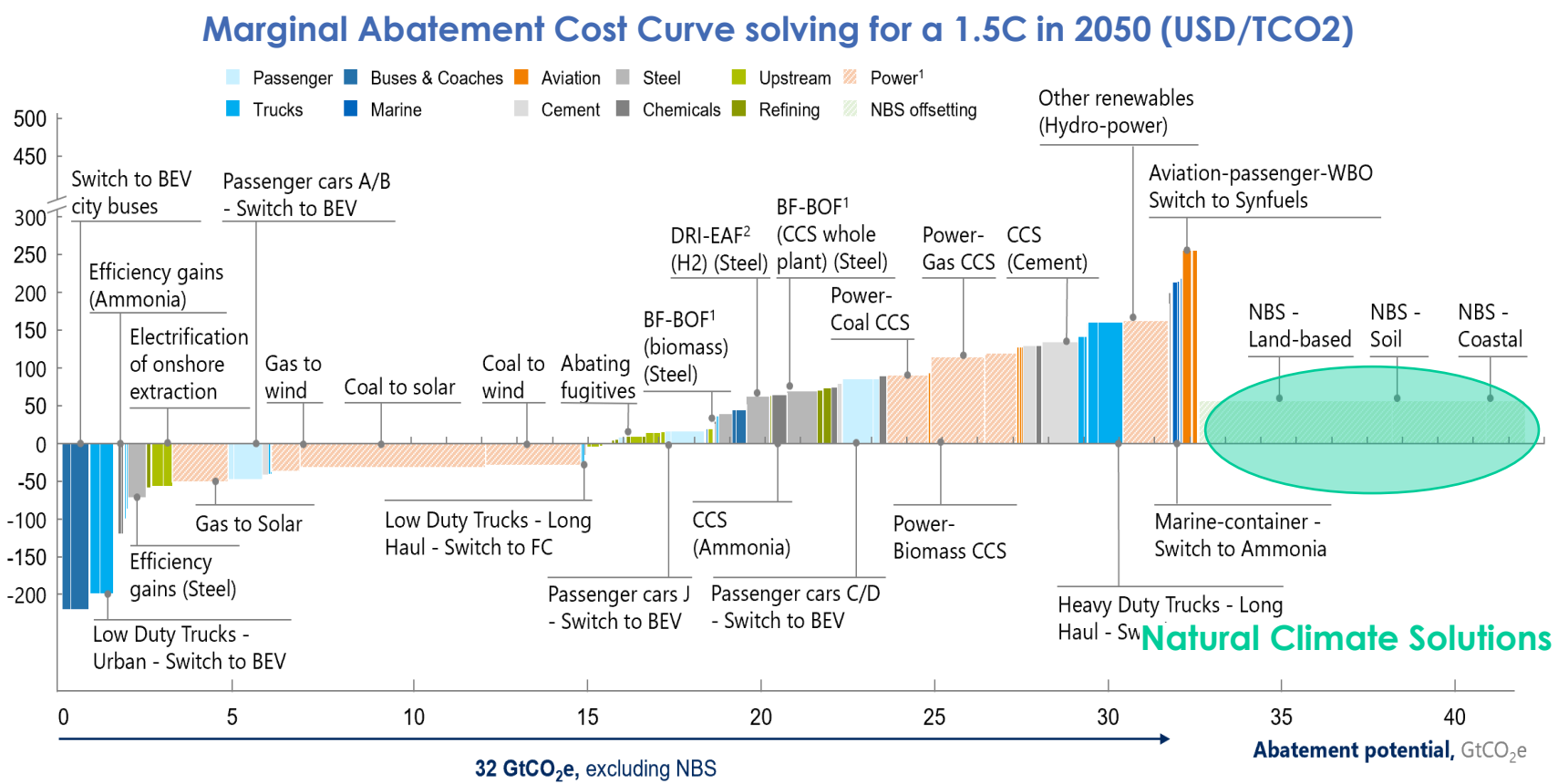
Negative emissions in the range of 0-1 GtCO2/year by 2030 are likely to be needed to limit global warming to 1.5C.

BECCS are likely to play a key role to decarbonise the power sector whilst offsetting emissions from other hard to abate sectors.

**E.g. Drax (Humberside, UK)**

**Sources:** IPCC Special Report 1.5 – Summary for Policymakers (2018);

# NCS - Technology solutions mapped with MACCs



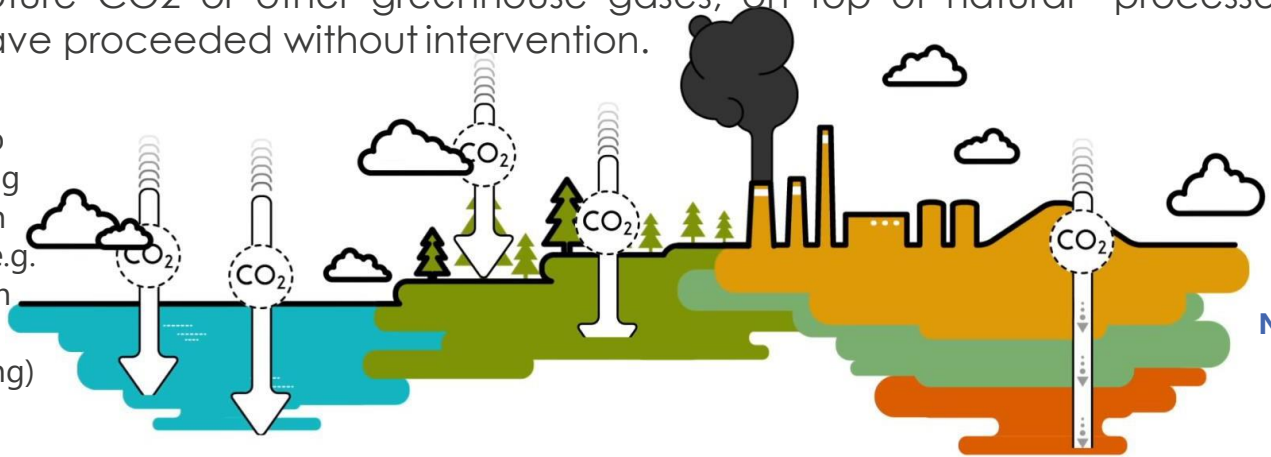

**1** Blast Furnace (BF) to Basic Oxygen Furnace (BOF) **2** Direct Reduced Iron (DRI) in the Electric Arc Furnace (EAF)
**Source**: McKinsey GHG Assessment Proprietary Tool

# Deep dive on Natural Climate Solutions (NCS) - Definitions

## What are Natural Climate Solutions?

- **Carbon sinks remove CO2 from the atmosphere and reduce its concentration in air**. They can be natural (oceans, plants, forests, and soil) or artificial deposits (using technologies and chemicals).
- Here, **nature-based solutions (NCS) focus on the natural carbon sinks**, and including **innovation that can enhance the sequestration ability** of the natural sink to absorb and capture CO2 or other greenhouse gases, on top of natural processes that would have proceeded without intervention.

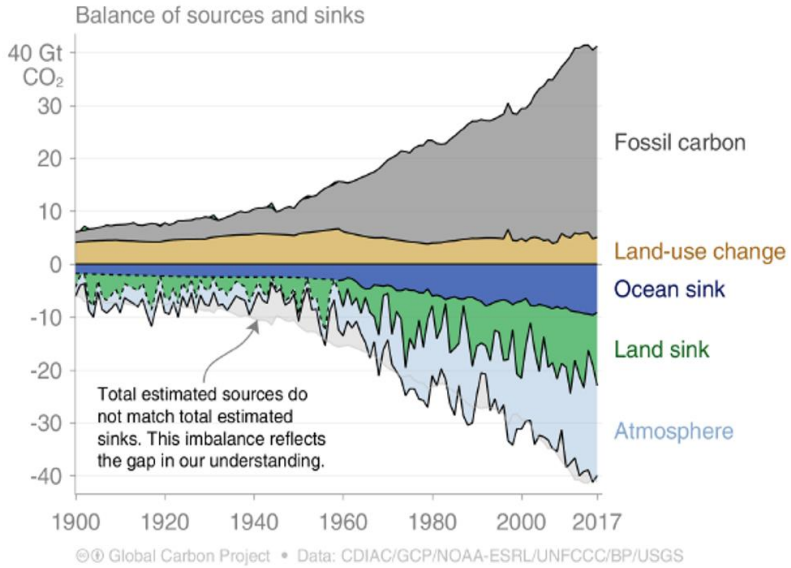
**Included**
innovations to enhance existing natural carbon sinks in ocean (e.g. liming) and on land (e.g., optimized grazing)

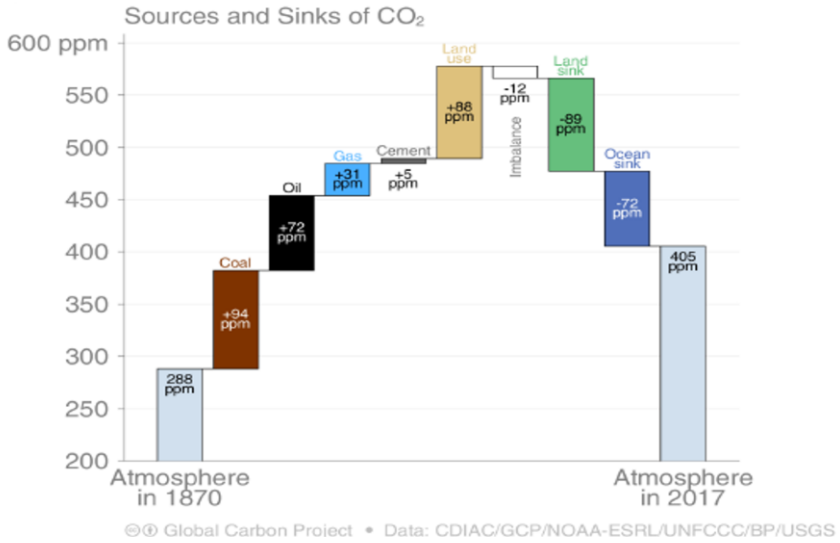



**Not included**
(included as CCUS)

**Source**: Active Sustainability (2019)

# Brief recap on NCS: sources and sinks of emissions in the World

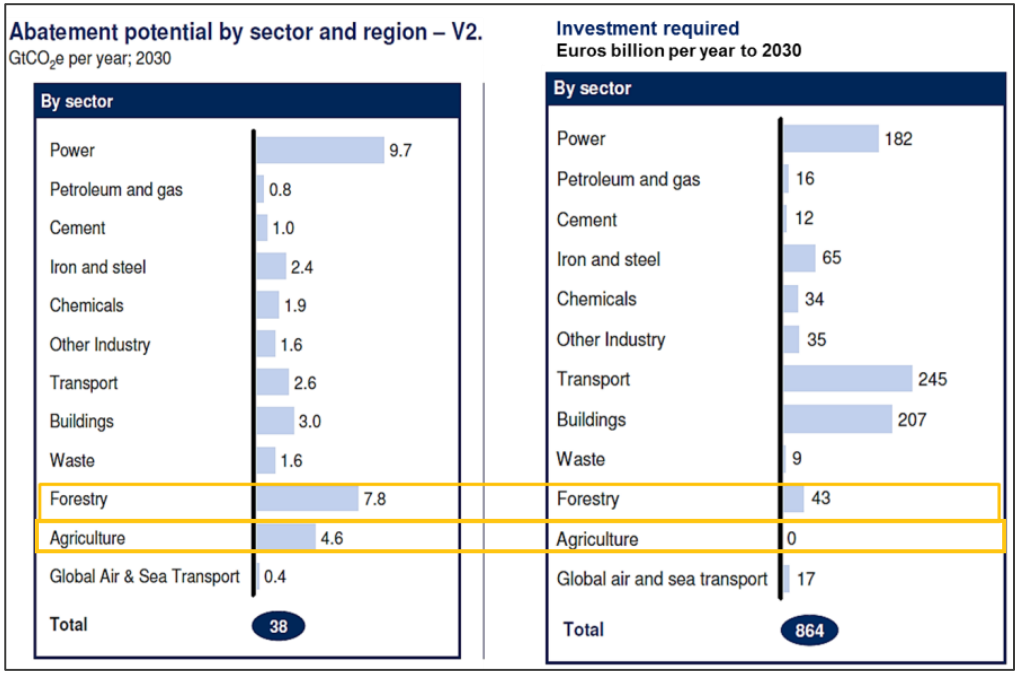



**Source**: Global Carbon Project (2018)

# Deep dive on NCS: Abatement Potential for Natural Climate Solutions

## What is Natural Climate Solutions abatement potential?



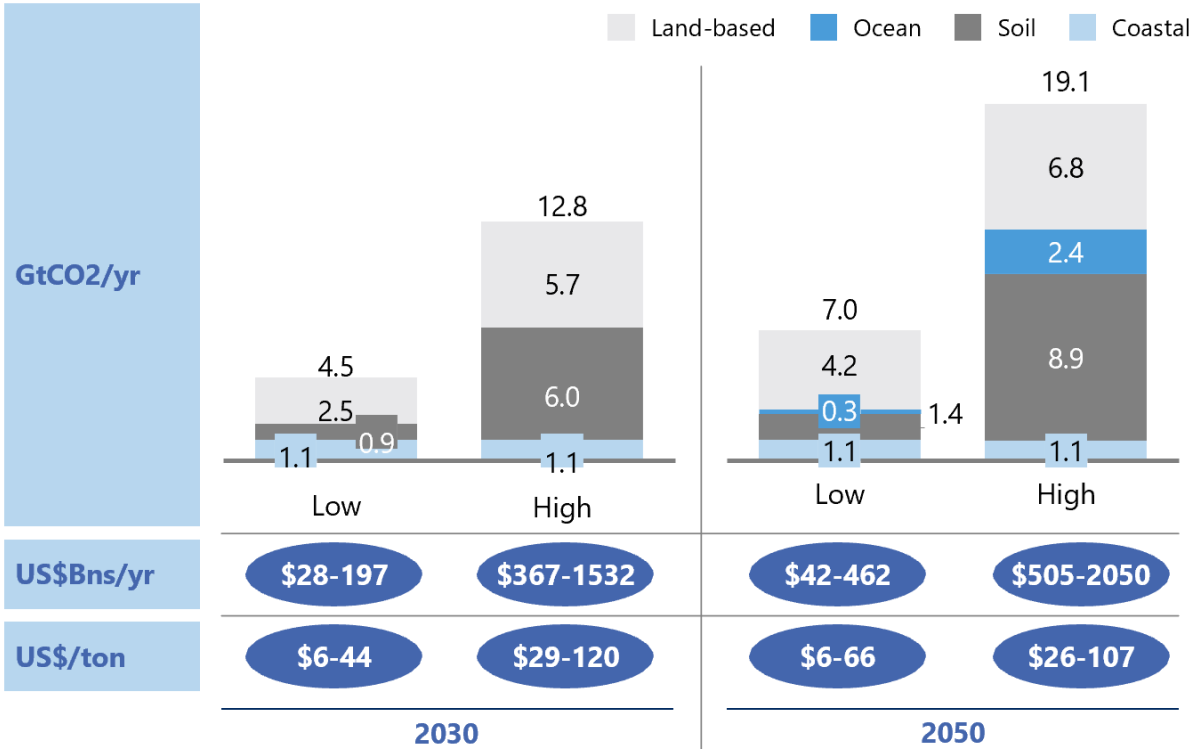

### Natural Climate Solutions represent a large abatement opportunity with low abatement cost

- At least 1/3 of the emissions reduction efforts to achieve the 2 degree goal could come from mature NBS available in the short term.
- Potential up to 20-25 GTCO2e/y
- Mostly <100 USD/t.
  8.5 GTCO2e/y < 15 USD/t
- Multiple co-benefits across SDGs (economic growth and diversification, improvement of human health and livelihood and protection of biodiversity and water resources, in line with UN Sustainable Development Goals)

**Sources:** Baker McKenzie – The potential for engaging in carbon removal and management efforts in Land Use, Land Use Change and Forestry (LULUCF) and natural sinks; McKinsey Pathways to a Low-Carbon Economy, Griscom et al. (2017)

# Deep dive on NCS: Abatement Potential for Natural Climate Solutions

- **Sequestration potential** ~5-13 GtCO2/yr in 2030 and 7-19 GtCO2/yr in 2050
- **Average cost ranges** are uncertain, ranging from $6 to $120/ton, with potential for higher with more complex projects
- **~60% of sequestration opportunity** in 2050 is likely to come from Asia and the Americas




**Source:** McKinsey GHG abatement cost curve v2.0; Griscom, PNAS; Oxford Stranded Assets and NETs

# Deep dive on NCS: How nature-based solutions are often implemented

| PROJECT | SOURCE OF PROJECTS | SOURCE OF FUNDING | BENEFITS TO INVESTOR |
|---|---|---|---|
| **Voluntary offset** | ▪ Independent organizations (often non-profit) actively look for lands/forests which can be afforested/expanded | ▪ Organizations/Companies /Individuals willing to offset their carbon emissions | ▪ Carbon certificates proving that investor offset some of their $CO_2$ emissions |
| **Government-led** | ▪ Government makes decision to af-/reforest unused agricultural/ industrial land | ▪ Government funds for land management | ▪ Lower emissions from LULUCF, which may bring country closer to GHG emissions target<br>▪ Profit from forest use |
| **Philanthropy-led** | ▪ Philanthropic organization provides funding and support for projects | ▪ Philanthropy | ▪ Lower emissions and provide carbon sinks to further environmental-related missions |

**Sources:** Press search, expert interviews

# Deep dive on NCS: practical example of an NCS Project

## Petrobras's support to Florestas de Valor

- The project, located in the Brazilian Amazon, aims to conserve more than 2 million hectares of rain forest.
- A non-profit partner, the Institute for Forest and Agricultural Management and Certification (IMAFLORA), is carrying out the certification.
- Between 2014 and 2020, Florestas de Valor saved an estimated 28,000 tonnes of carbon dioxide emissions from release into the atmosphere through deforestation.
- Between 2018 and 2020, it created 20 forest nurseries and established 133 hectares of agroforestry systems.
- Local communities involved have generated BRL 1.4 million of income (2018-2020)