

Oil & Gas Industry Engagement on Climate Change

October 8, 2019

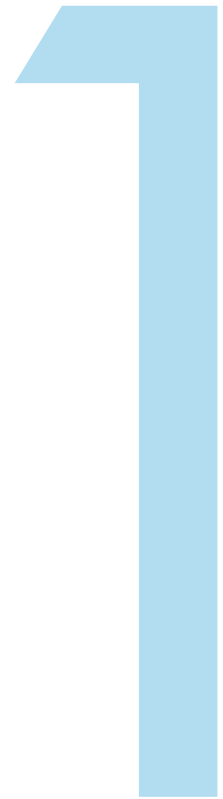
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Project Overview

- Climate change is the most strategic issue facing the energy industry today.
- Great deal of pressure and focus on the role of oil and gas companies
- Research and convening to understand the way in which a subset of oil and gas companies are engaging with a focus on technology and new business ventures.
- Report covers:
 1. Why are oil and gas companies acting on climate change?
 2. How much do they contribute to the problem? What is unique about their challenge to be part of the solution?
 3. What are companies doing to act? How do stakeholders regard this action?
 4. What is working? What isn't working? Discussion of company strategies.



Why are oil and gas companies taking action on climate change?

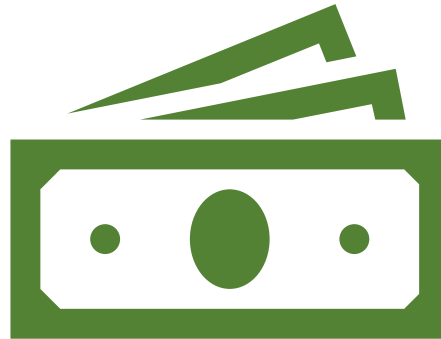
O&G companies are responding to policy...

A proliferation of government policies addressing GHG emissions:



Market Mechanisms

51 carbon pricing initiative exist today covering 20 percent of global GHG emissions



Subsidies

In 2017, rising to \$143 billion for renewables and declining to \$300 billion for fossil fuels

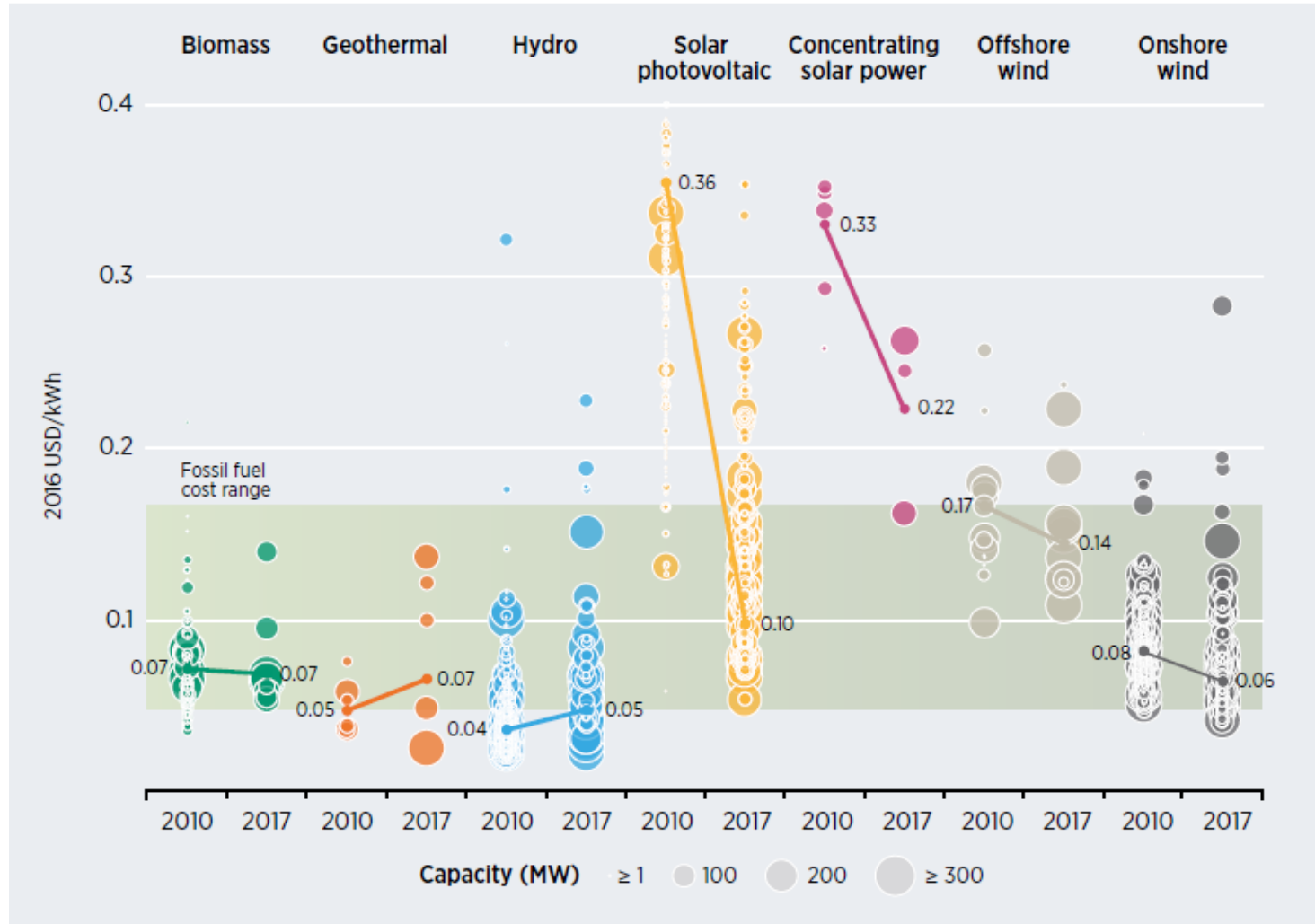


Mandates

142 countries have targets or mandates for renewable power in generation

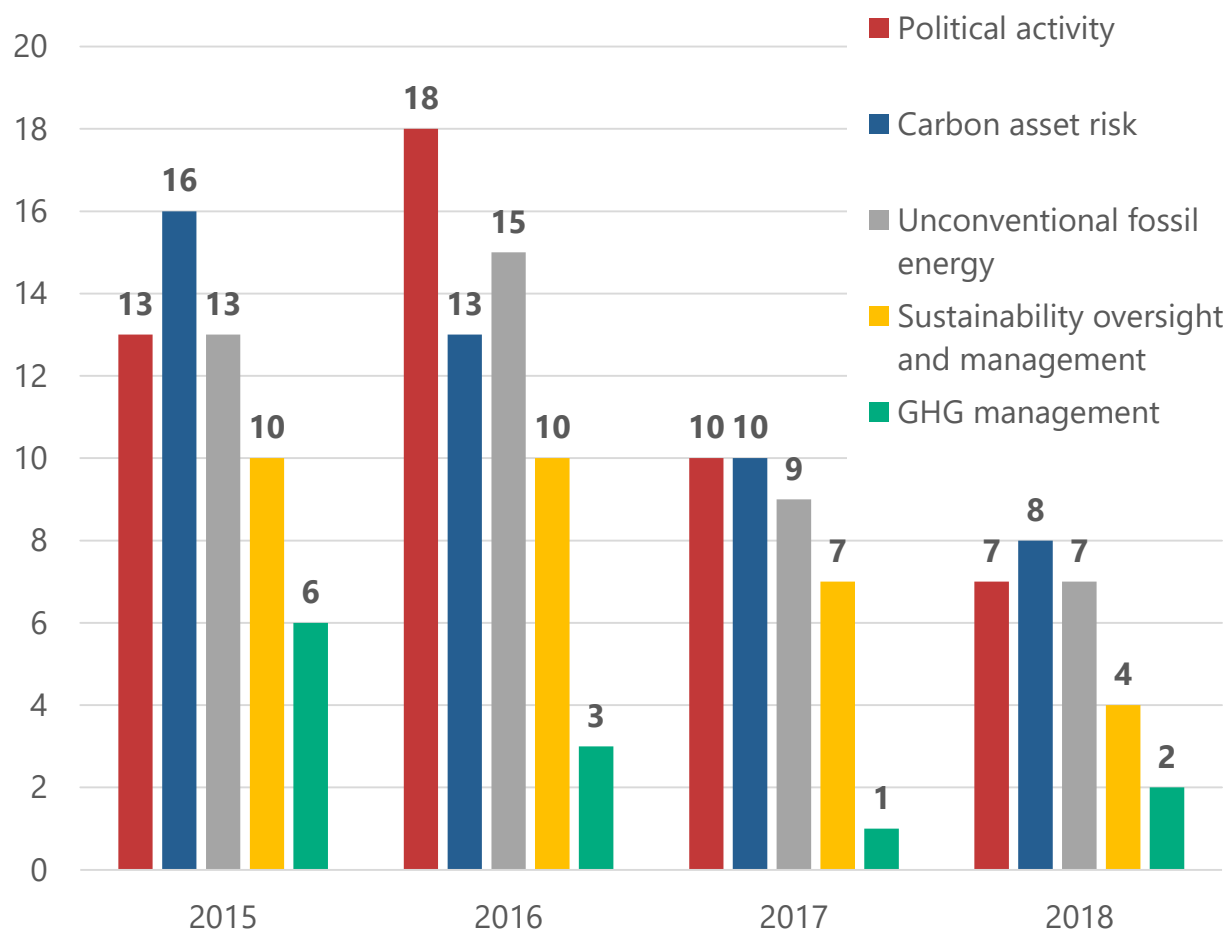
...and the lower cost of emerging tech...

Global levelized cost of electricity from utility-scale renewable power generation tech, 2010-2017

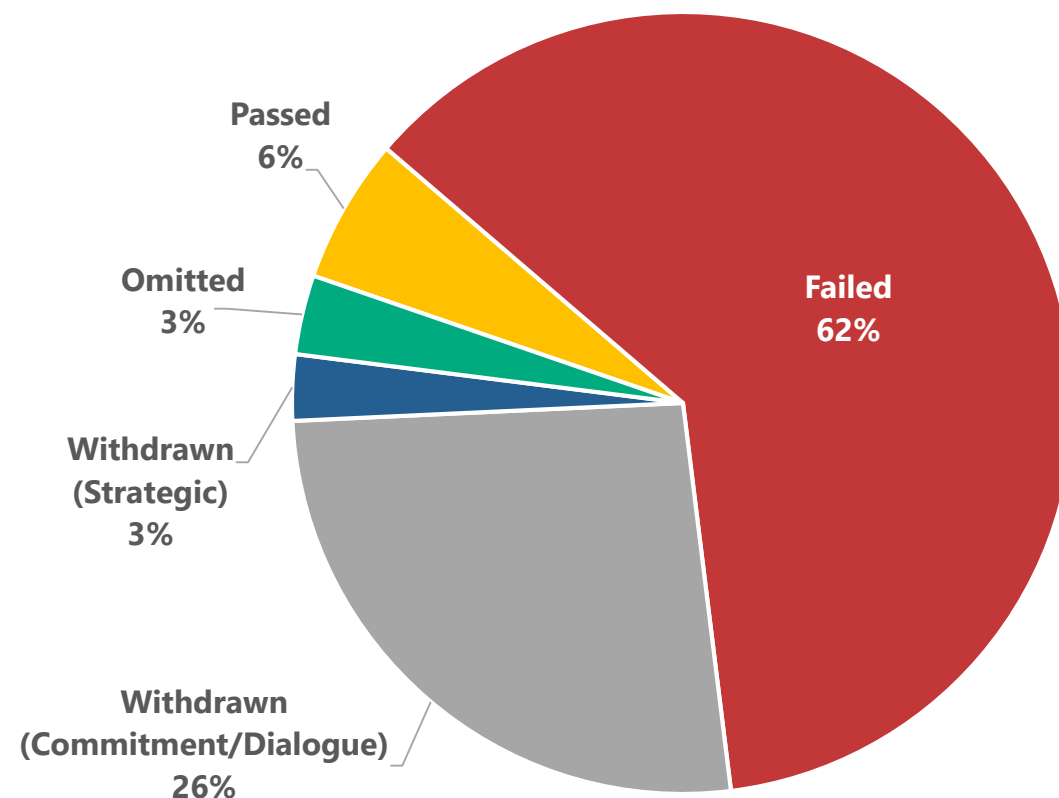


...and investor pressure to address climate-related risks.

Climate-Related Shareholder Resolutions at O&G Companies, 2015-2018



Status of Climate-Related Shareholder Resolutions at O&G Companies, 2015-2018



Data source: CERES, Engagement Tracker (2019), <http://engagements.ceres.org>.

However, not everyone is taking the same amount or kind of action.



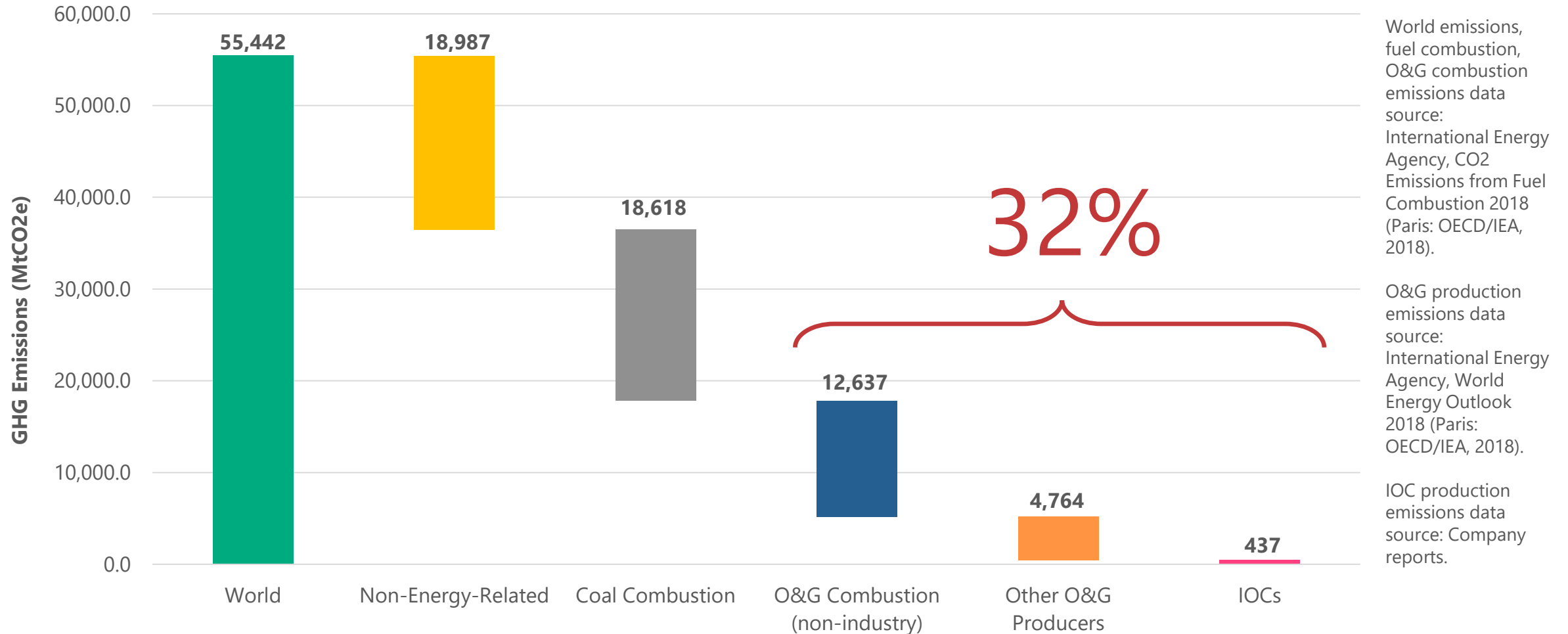
A large, light blue number '2' is positioned on the left side of the slide, serving as a visual indicator for the second point in a list.

How much do oil and gas companies contribute to the problem?

What is unique about their challenge to be part of the solution?

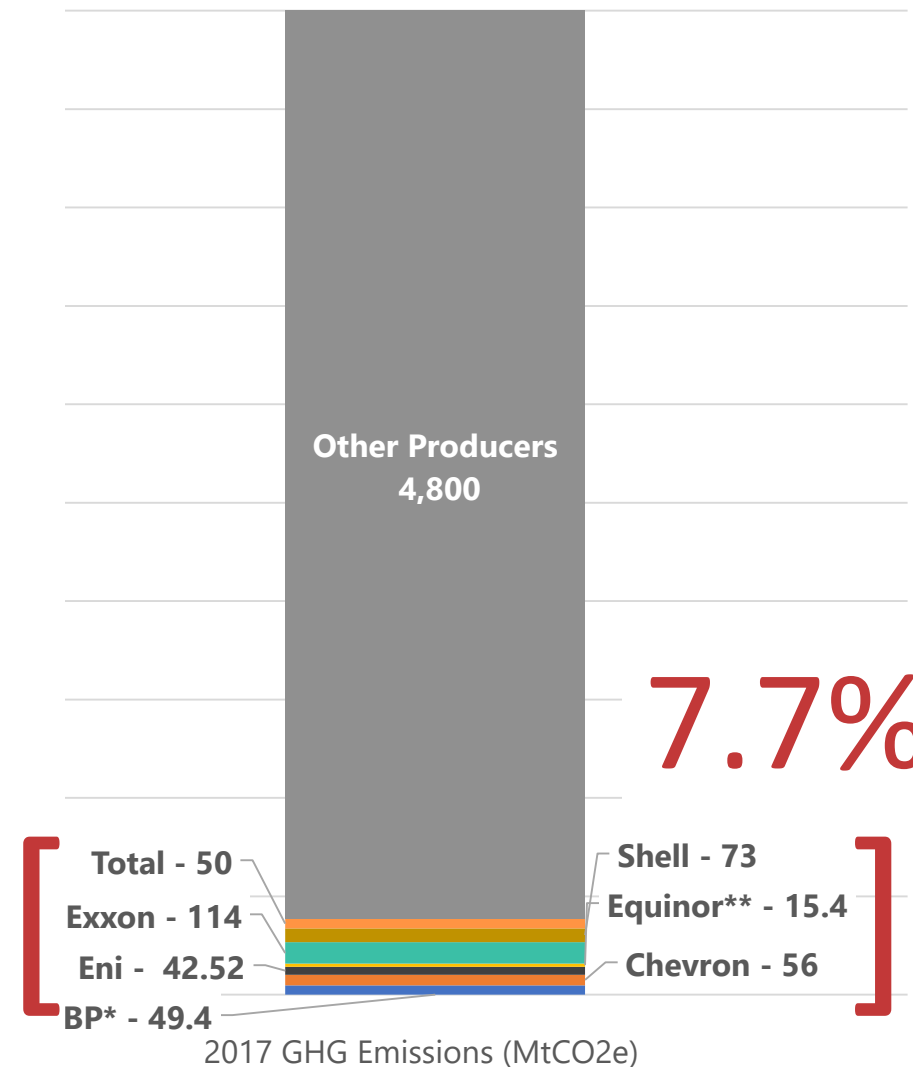
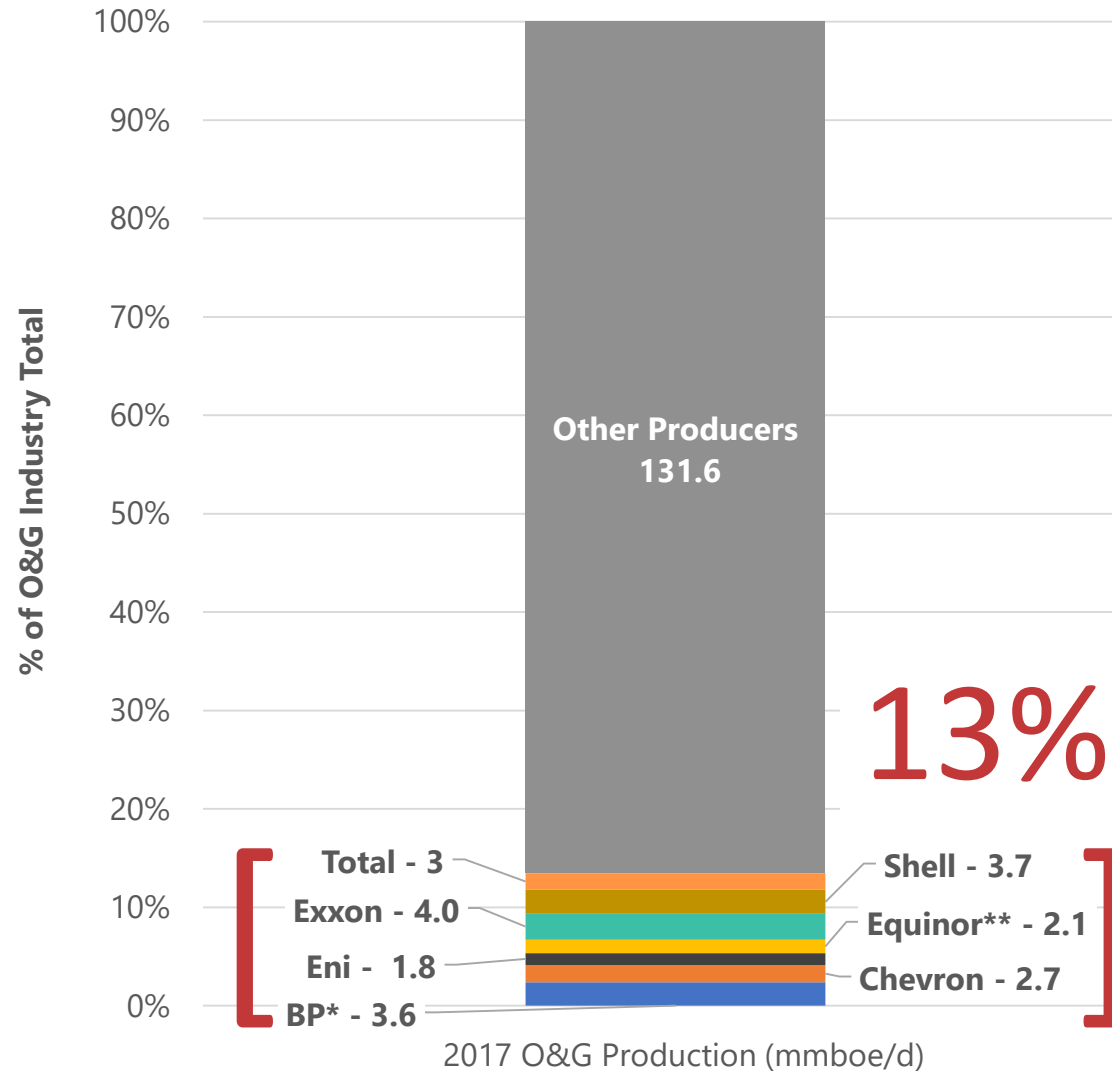
O&G emissions are one part of the global mix.

Breakdown of Global GHG Emissions



IOCs are a small part of production & emissions.

O&G Production and GHG Emissions, 2017



O&G production data
source: BP, BP
Statistical Review of
World Energy 2018
(London: BP, 2018);
Company reports.

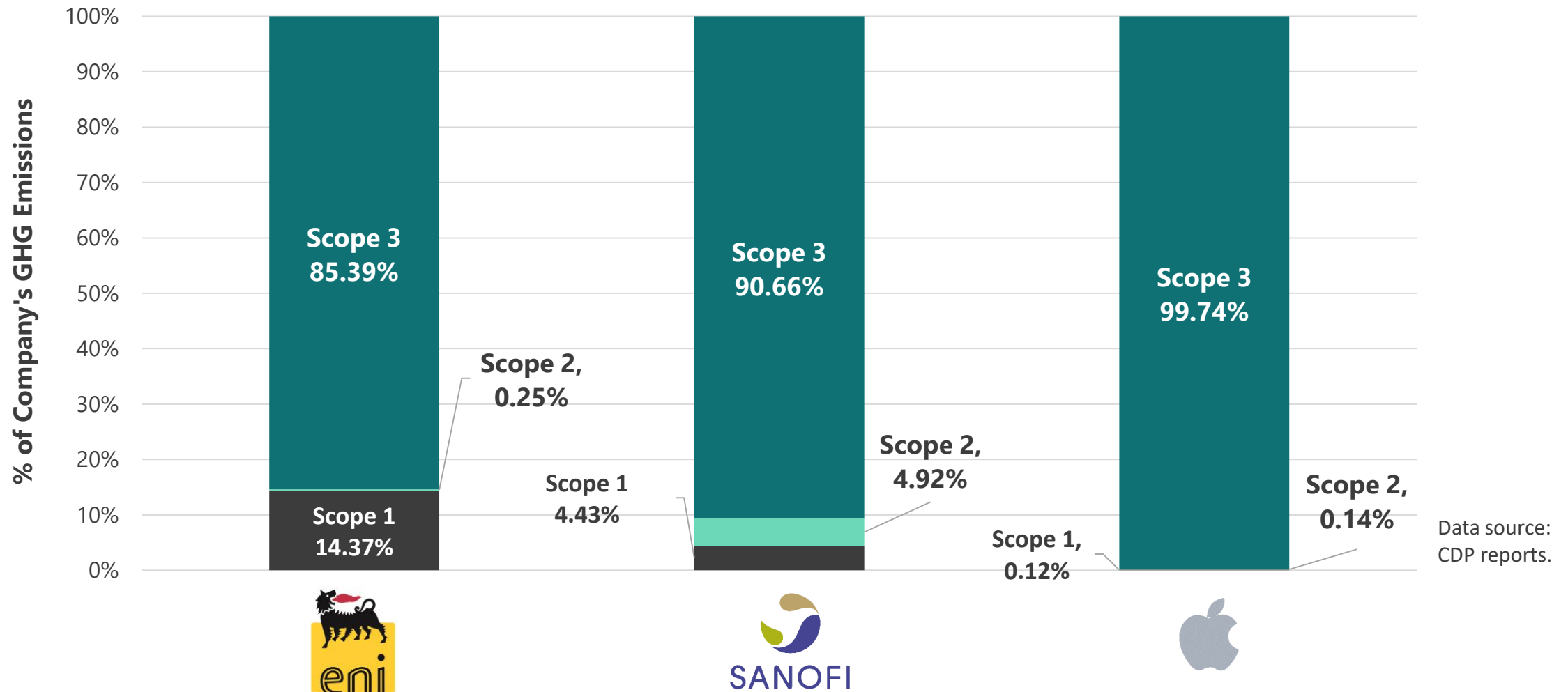
GHG emissions data
source: International
Energy Agency, World
Energy Outlook 2018
(Paris: OECD/IEA,
2018); Company
reports.

* ex Rosneft

** Reported on 100%
operated basis

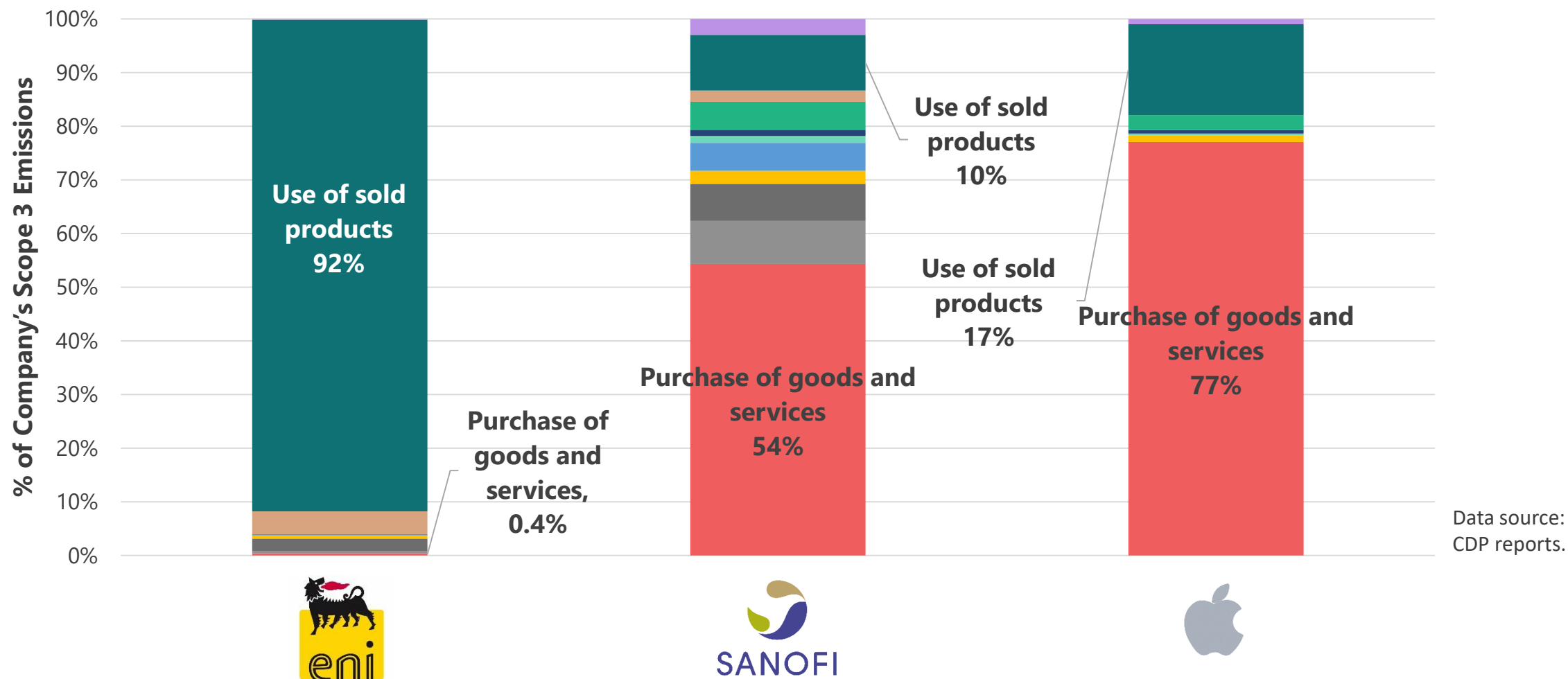
Indirect emissions are far more important than direct...

O&G Production and GHG Emissions, 2017



...and O&G companies have a unique problem in addressing them.

Scope 3 Emissions by Category, 2016



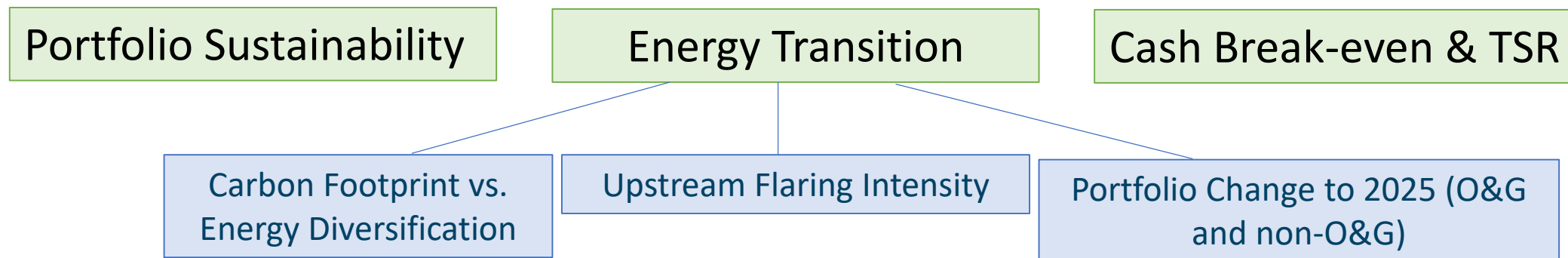
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**What are companies
doing to take action?**

**How do stakeholders
regard this action?**

Positioned to Transition: Investor Assessment

Example 1: JPM Energy Transition “Trilemma”

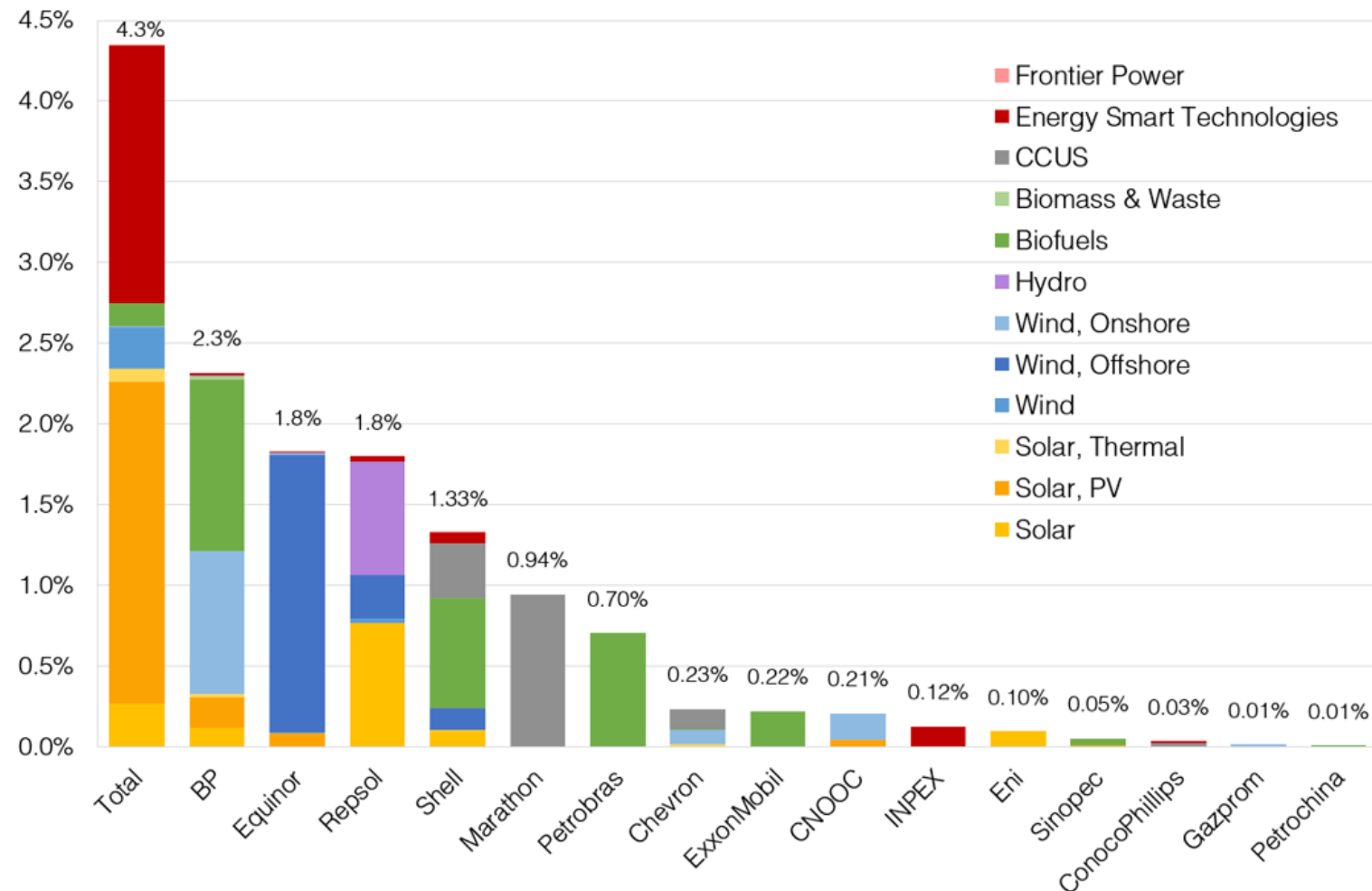


Example 2: GS “Big Oils” to “Big Energy”

Scope 1	Scope 2	Scope 3
<ul style="list-style-type: none">• Reduce flaring• Reduce methane emissions• Exit from high carbon extraction• Improve production efficiency• Production shift toward gas• Expand renewable production	<ul style="list-style-type: none">• Improve carbon intensity of 3rd party power and heat• Use renewables and gas to power operations	<ul style="list-style-type: none">• Increase petchem v. refining• Integrated value chain in power• Shift to gas• CCS & natural sinks• Increase share of biofuels

Spending as % of CAPEX: How CDP looked at this issue

Disclosed low-carbon investment as a proportion of total CAPEX (2010 – Q3 2018)¹



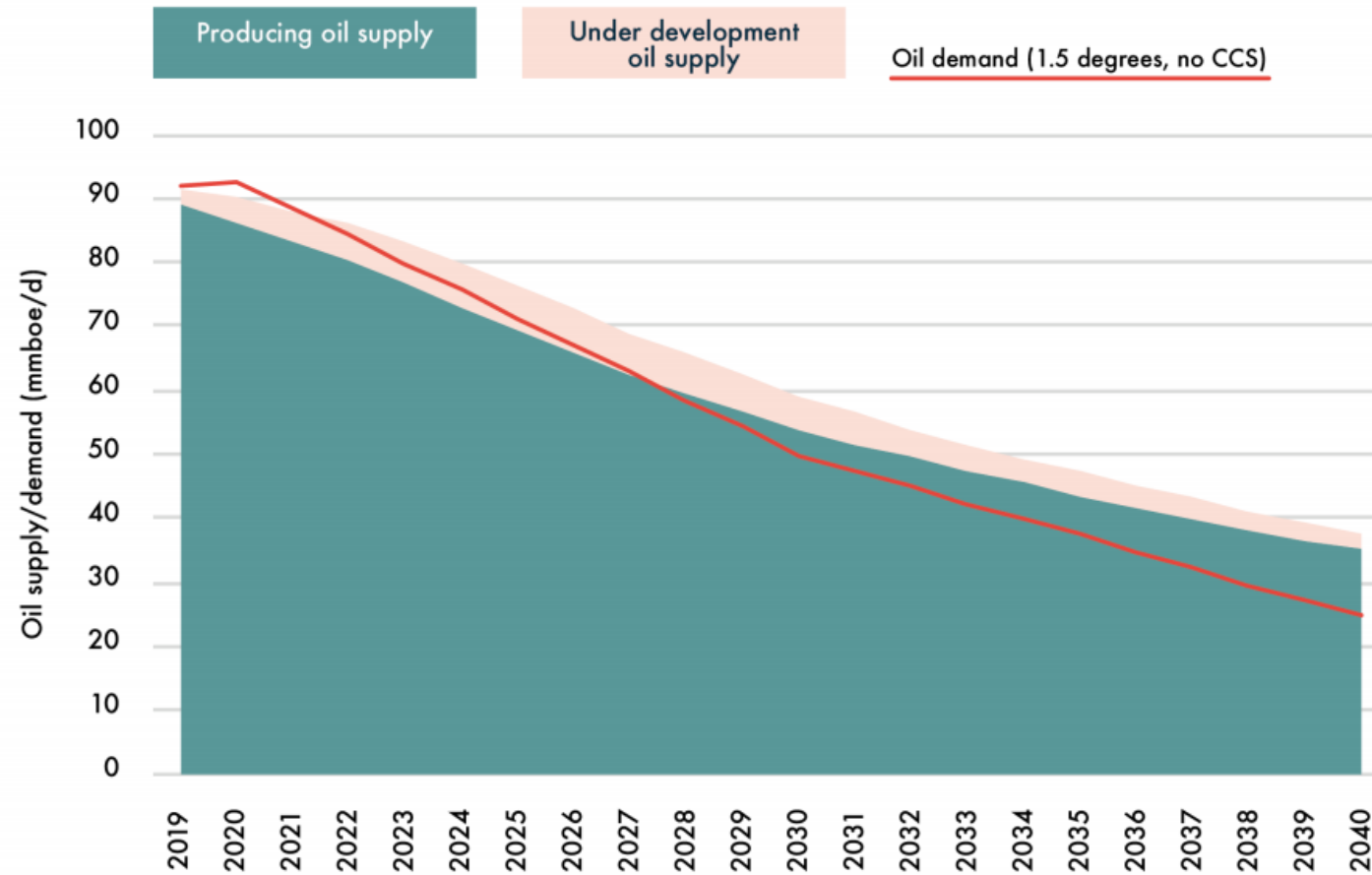
¹ Includes Asset finance, M&A, and venture capital spending.

Note: No disclosed investment for Anadarko, Apache, Hess, Noble Energy, Occidental, OMV, Rosneft, and Woodside.

Source: Fletcher et al., Beyond the cycle (London: CDP, 2018).

Carbon budget perspective continues to evolve

FIGURE 1. COMPARISON OF 1.5°C (NO CCS) PATHWAY TO POST-FID OIL PRODUCTION



From broad notions of carbon budget and reserves to specific applications of those budgets to company decisions and segments of the industry.

Our approach: Patterns in non-O&G activity

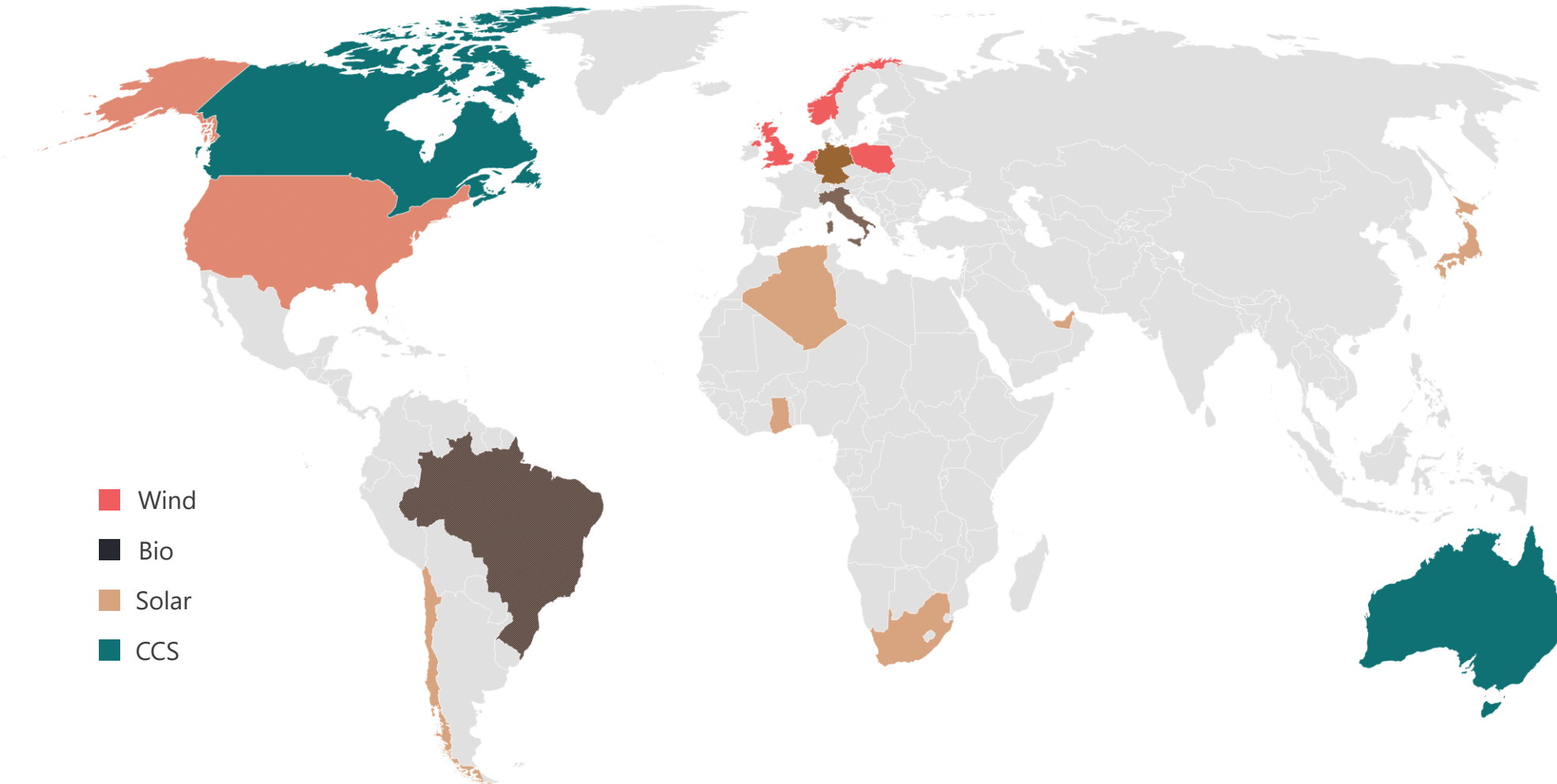
Existing & Proposed Assets, 2018 (excluding R&D)

		BP	Chevron	Eni	Equinor	ExxonMobil	Shell	Total
Manufacturing	Solar							
	Energy storage							
Deployment	Wind							
	Solar							
	Other (Biomass, Geothermal, Hydropower, Hydrogen)							
	CCS							
	Grid-connected storage							
Electricity Retail	Electricity sales (renewables)							
	On-site generation							
	Other services (e.g., demand response)							
Transportation	Public EV charging							
	Private EV charging							
	Alternative fuels							

Data source:
Company reports,
press releases,
and news articles.

Projects are concentrated mostly in U.S. & Europe.

O&G Energy Projects: Operational and In-Development, 2018

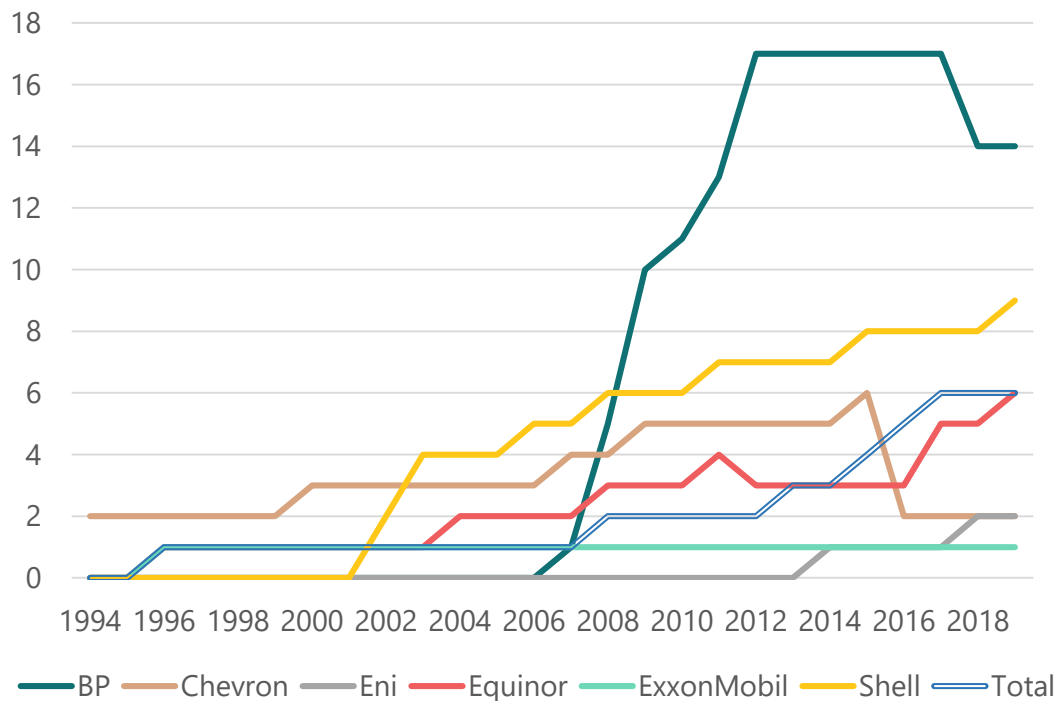


Country	Projects
Algeria	1 solar
Australia	1 CCS
Brazil	3 bio, 2 solar
Canada	1 CCS
Chile	1 solar
Germany	1 wind
Ghana	1 solar
Italy	1 solar, 2 bio
Japan	1 solar
The Netherlands	3 wind
Norway	3 CCS, 1 wind
Poland	3 wind
South Africa	1 solar
U.A.E.	1 solar
U.K.	4 wind
U.S.	20 wind, 5 solar

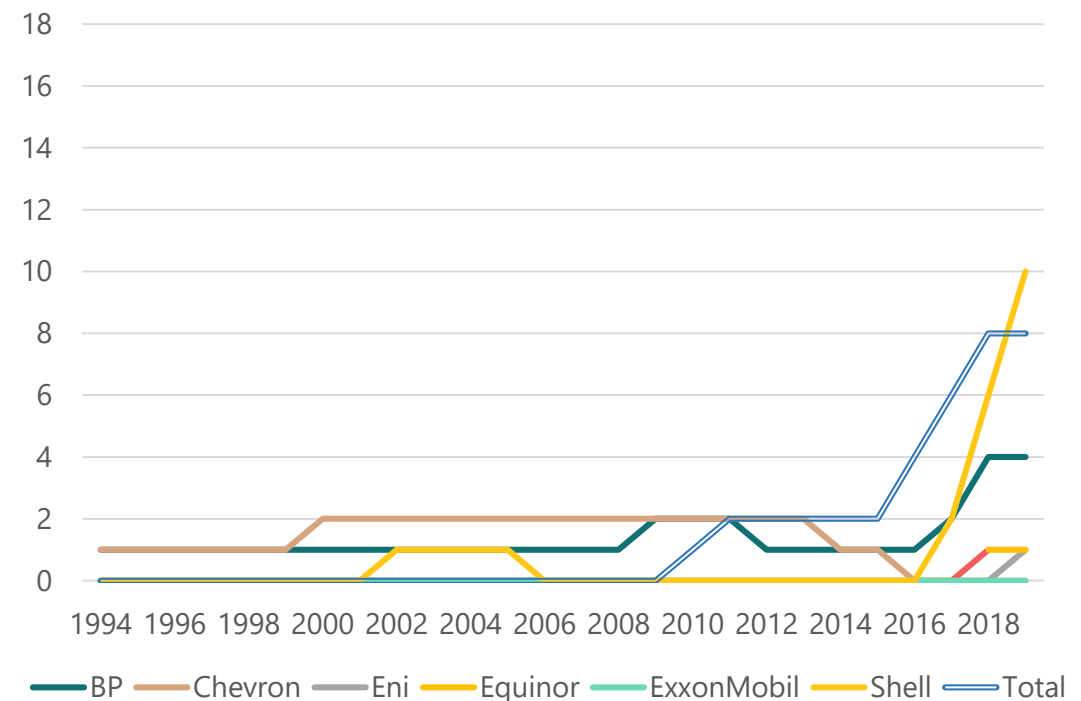
Data source: Company reports, press releases, and news articles.

Most companies focus on projects rather than subsidiaries.

O&G Low-CO₂ Projects, 1994-1H 2019



O&G Low-CO₂ Company Investments, 1994-1H 2019



Projects & Companies, 1H 2019

	BP	Chevron	Eni	Equinor	ExxonMobil	Shell	Total
Projects	14	7	2	6	1	8	6
Companies	4	0	1	1	0	10	8

Data source: Company reports, press releases, and news articles.

O&G company actions build upon each other.

Level 1

Invest in new approaches to reduce operational emissions

Examples:



Chevron has used predictive analytics and monitoring and optimization software to reduce GHG emissions



Shell is testing new methane leak detection to better identify leaks in real time

Level 2

Support new technologies through R&D and/or venture capital

Examples:



ExxonMobil has invested \$250 million in algae biofuels over the past ten years



BP has invested in FreeWire Technologies, a manufacturer of mobile EV chargers

Level 3

Develop non-oil and gas projects (organically or through M&A)

Examples:



Eni is building solar projects at its facilities



Equinor is leveraging its experience in offshore exploration to build offshore wind projects



Total has diversified into battery and solar panel manufacturing through acquisitions

Some O&G company actions stand out as unique.



Driving advancements in wind energy technology

Equinor is demonstrating floating offshore wind projects.



Scaling manufacturing of solar PV and batteries

Total acquired SunPower and Saft.



Betting on the growth of EVs, scaling charging networks, and integrating into existing fueling stations

Shell acquired NewMotion EV charging network & formed partnerships with Allego and IONITY.

O&G companies pool resources and set targets.

Efforts are focused on the industry



ExxonMobil



\$1 billion

over 10 years

Climate Investments Fund to reduce methane leakage, reduce CO₂ emissions, and develop CCUS

0.25% by 2025

0.20% ambition

Upstream methane intensity target

4

Opportunities for Further Action

IEA: Tracking Clean Energy Progress 2018

● On track ● More efforts needed ● Not on track 🔍 One to watch

● Power

● Renewable power

● Solar PV

● Onshore wind

● Offshore wind 🔍

● Hydropower

● Bioenergy

● Geothermal

● Concentrating solar power

● Ocean

● Nuclear power

● Natural gas-fired power

● Coal-fired power

● CCUS in power

● Buildings

● Building envelopes

● Heating

● Cooling 🔍

● Lighting

● Appliances & equipment

● Data centres & networks

● Transport

● Electric vehicles

● Fuel economy of cars & vans

● Trucks & buses

● Transport biofuels

● Aviation

● International shipping 🔍

● Rail

● Industry

● Chemicals 🔍

● Iron & Steel

● Cement

● Pulp & paper

● Aluminium

● CCUS in industry & transformation

● Energy integration

● Energy storage 🔍

● Smart grids

● Demand response

● Digitalization

● Hydrogen

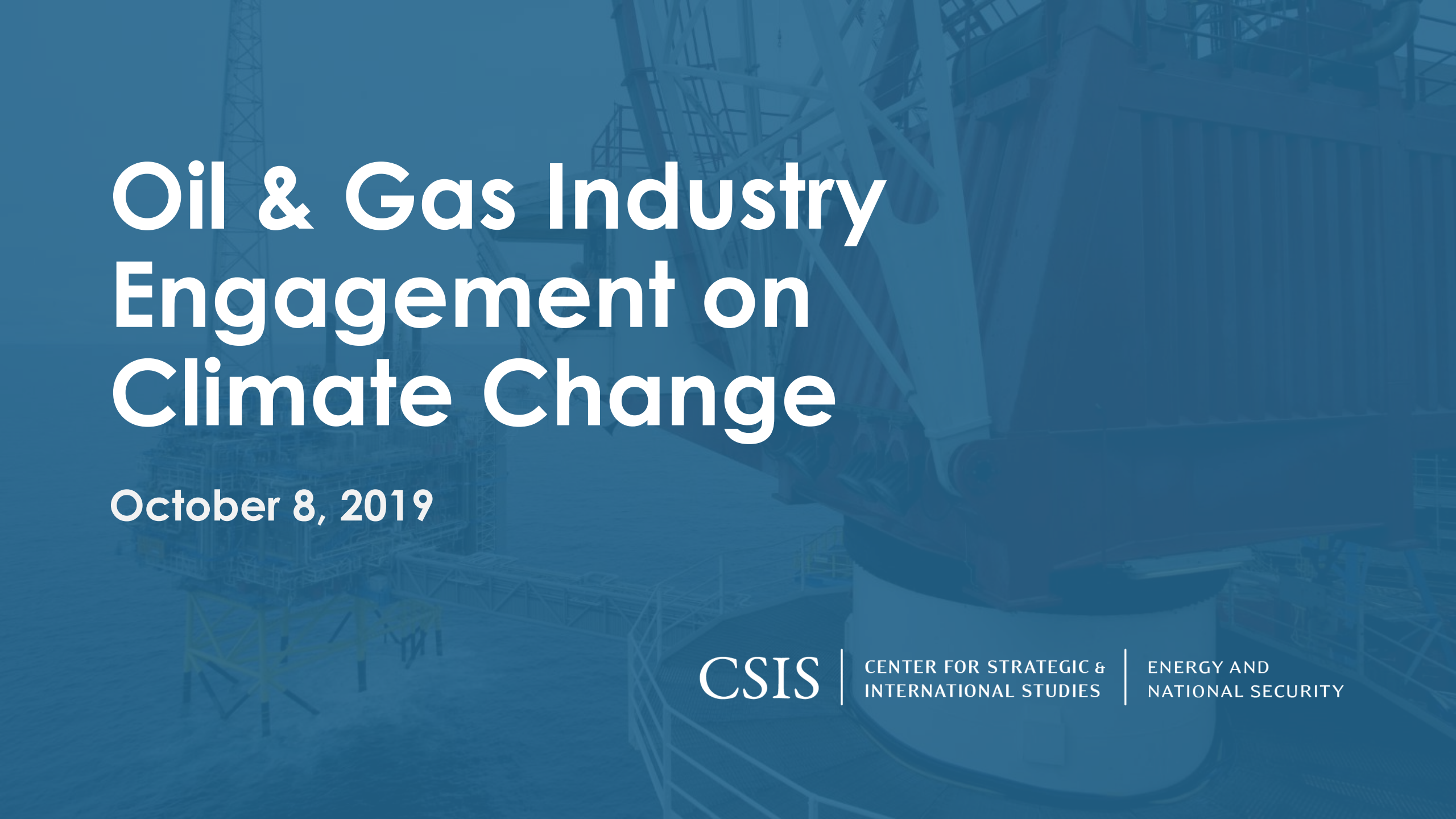
● Renewable heat

Opportunities for Further Action

- **Electric Vehicle Charging** – Many IOCs moving in this direction. EVs still a small market but recognized as the future direction for transport.
- **Electrification** – Offers both practical benefits (replacing diesel equipment in operations). Some skeptical views but other views that industry could achieve scale and tackle infrastructure challenges well.
- **Hydrogen** – An area where several companies are actively investing. Important role to play in early stage demonstration projects to illustrate potential applications and inform regulatory, policy and commercial environment to make hydrogen applications successful.
- **Direct Air Capture** – A new entrant to company investments but generally a good amount of interest in learning more. Important role to play in early stage demonstration projects to illustrate potential applications and inform regulatory, policy and commercial environment to drop the cost and scale DAC applications.
- **Carbon Capture, Use and Sequestration** – An area with individual as well as collection action among companies. Viewed as extremely important especially for company strategies to promote natural gas over the longer-term.
- **Offshore Wind** – Core area of focus for some companies. Generally regarded as area where industry has unique set of skills to offer and potential competitive advantage.

What's Working and Not Working

- **Source of investment and partnership for clean tech community** – The network of companies that are working with the oil and gas community is growing. Providing much needed capitalization and partnership.
- **Learning about technology and business models** – Companies are learning about and developing strategies to understand the business potential of new technologies and applications. It was notable that some companies saw opportunity where others did not. This signals potential divergence in transition strategies emerging over the medium-term where today they are still nascent.
- **Limits to clean tech capital allocation** – Still generally not allowed to sacrifice returns for new business ventures. As one company said – “they must perform today and position for tomorrow.”
- **Policy environment not robust enough to send clear signals** – Some companies noted the need for stronger policy frameworks to drive the direction of greenhouse gas emission and create certainty around new business opportunities. Other participants noted that companies can and should make additional efforts to advocate for (and certainly not against) those policies.



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