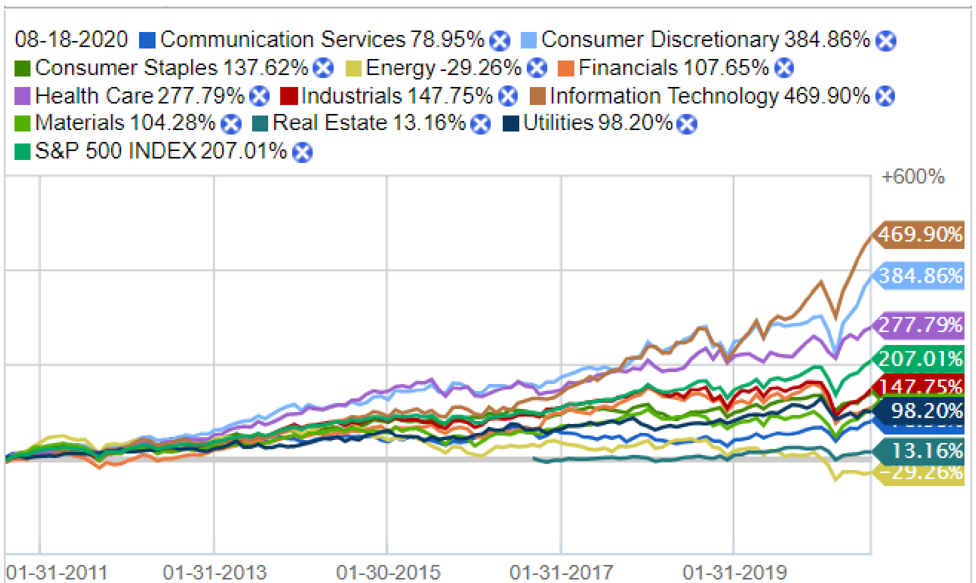
USEA CCUS Roadshow Webinar

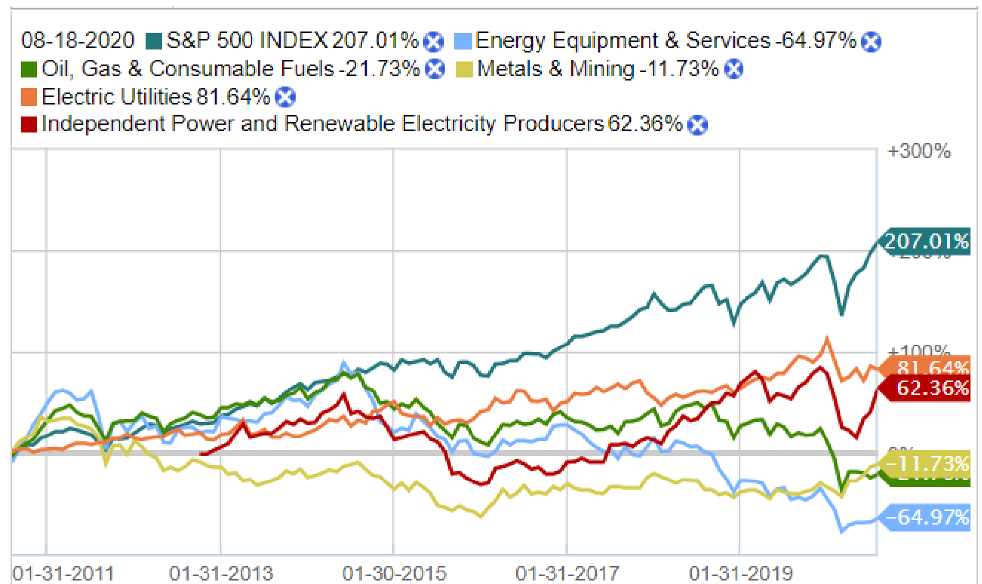
Nigel Jenvey, Global Head of Carbon Management

Gaffney Cline

The energy sector performance for investors over the last 10 years…

…has underperformed against other sectors due to commodity price cycles impacting returns

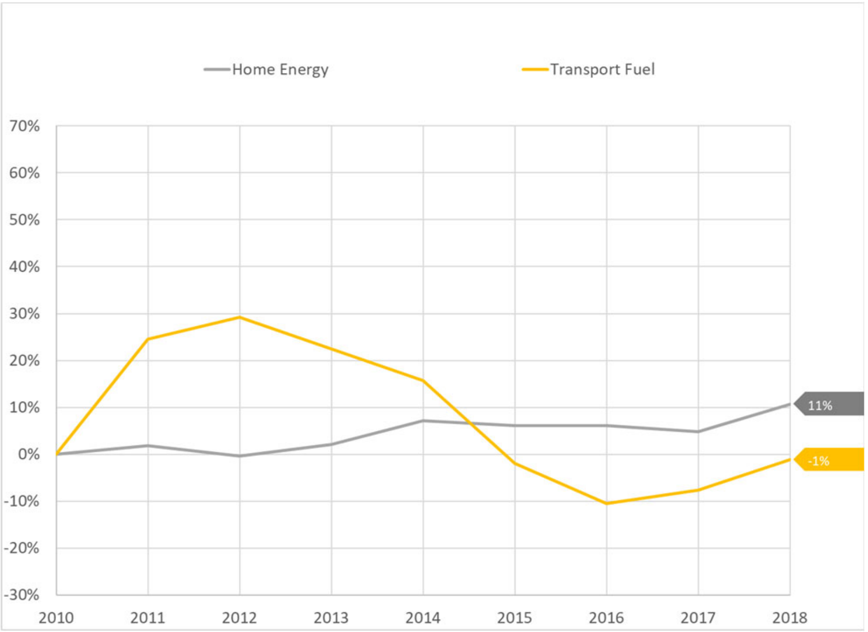


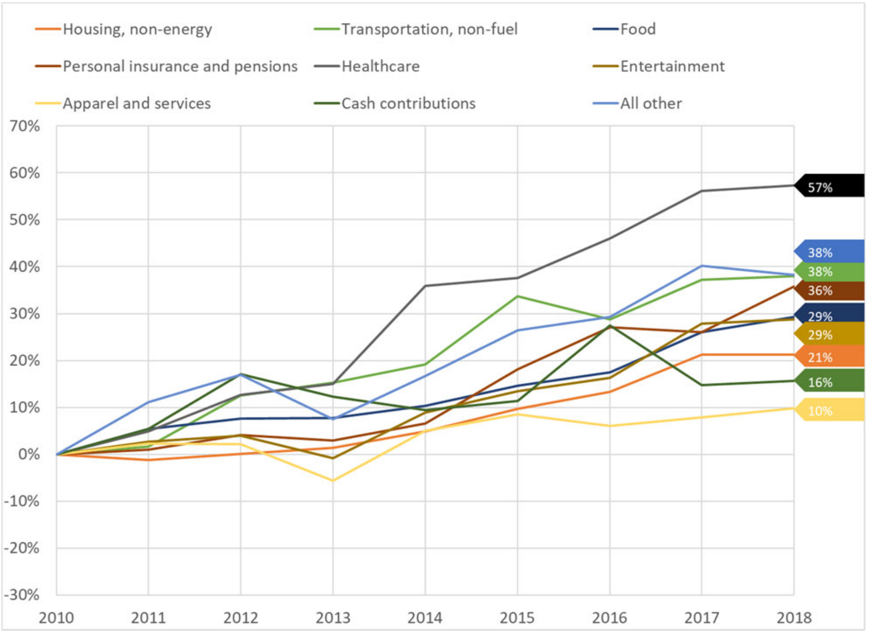


Source courtesy: Fidelity, Sectors & Industries Overview, 2020

However the U.S. energy sector performance for customers has been very effective to manage costs…

…but this is not recognized or rewarded by society





U.S. BUREAU OF LABOR STATISTICS

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Data courtesy: U.S. Bureau of Labor Statistics, 2011/2014/2018

Oil and Gas companies have new visions for the future…

…but is it enough to bring back the investors and maintain their social license?

Shell	Reduce net carbon footprint by 20% (2035) and 50% (2050)
bp	Net zero target (2050), large structural reorganisation to achieve
equinor	Carbon neutral (2030), reduce net CI by at least 50% (2050)
REPSOL	Reduce CI by 40% (2040)
KOSMOS ENERGY	Carbon neutral for Scope 1 & 2 emissions (2030)
Lundin Energy	Carbon neutral (2030)
engie	Reduce emissions by 52% per kWh of energy production (2030)
eni	Target net zero on upstream operations (2030)

- Parliament pension fund cuts fossil fuel investments — The Guardian, 24 Mar 2020
- CITING CLIMATE CHANGE, BLACKROCK WILL START MOVING AWAY FROM FOSSIL FUELS — The New Yorker, 16 Jan 2020
- Norway's Government Pension Fund Global gets go ahead to divest $13bn of investments — The Guardian, 12 Jun 2019
- World Bank to end financial support for oil and gas extraction — The Guardian, 12 Dec 2017
- European Investment Bank to phase out fossil fuel financing — The Guardian, 15 Nov 2019
- *Global Financial Giants Swear Off Funding an Especially Dirty Fuel* — The New York Times, 12 Feb 2020
- Danish pension provider ATP to halt fossil fuel investments via external funds — Reuters, 04 Feb 2020
- JP Morgan to withdraw support for some fossil fuels — The Guardian, 25 Feb 2020

Sources Herbert Smith Freehills and GaffneyCline, (2020), Webinar on Gas, Carbon Management and Renewables

Continued investment in oil and gas is needed through the Energy Transition…

…in both existing and new fields to offset natural decline

- Existing field production decline at ~8% per year is larger than any plausible fall in global demand
- However the type of resources, how they are developed and operated will need to be significantly different
- Markets will become increasingly competitive. Those with lower-costs and better environmental performance will benefit
- Large resource holders may attempt to gain market share while there is still scope to do so

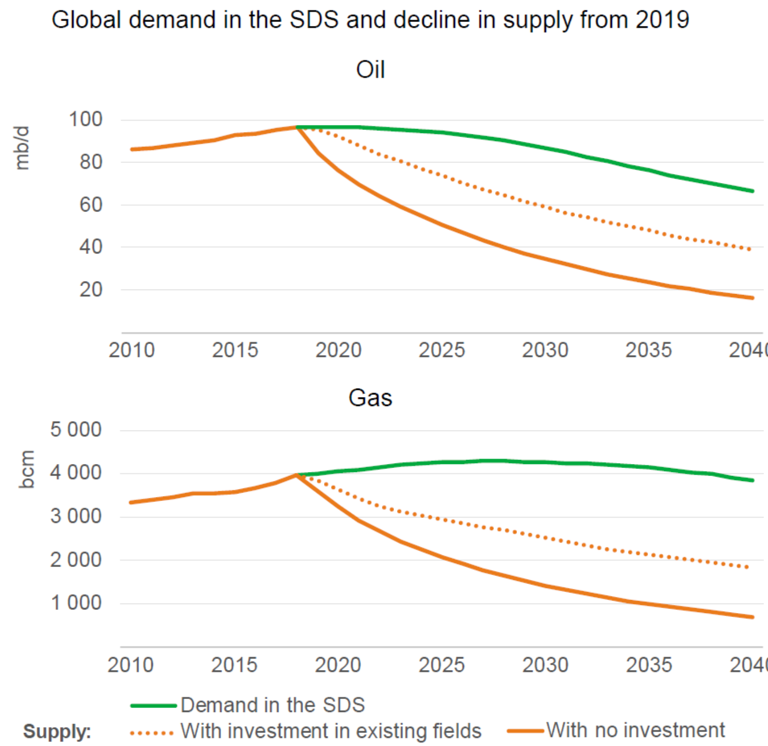
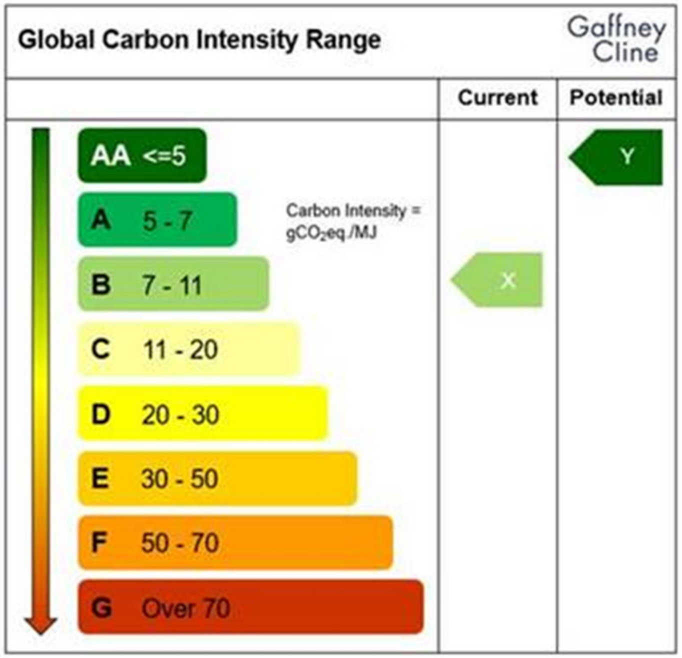


Image courtesy: IEA 2020, The Oil and Gas Industry in Energy Transitions

Carbon emissions from oil and gas supply are about 15% of global energy sector GHG emissions…

…but can vary considerably as not all oil and gas is created, developed or operated equally

- The global average carbon intensity (CI) of oil production is 10 gCO_2e/MJ but this can be as much as 15 times higher, doubling the emissions from end-use combustion
- ~50% reduction in the average CI from oil and gas operations is required by 2030 for the IEA Sustainable Development Scenario
- Ratings for current and potential CI performance can clarify improvements (e.g. energy efficiency, methane management, and CCUS) and allow current/future benchmarking of assets, regions, portfolios and corporate performance



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Quantification and certification of Carbon Intensity is need to provide clarity…

…to improve societal acceptance, reduce investment risks and ease stranded asset fears

Science AAAS

POLICY FORUM

ENERGY AND CLIMATE

Global carbon intensity of crude oil production

New data enable targeted policy to lessen GHG emissions

By Mohammad S. Masnadi, Hassan M. El-Houjeiri, Dominik Schunack, Yunpo Li, Jacob G. Englander, Alhassan Badahdah, Jean-Christophe Monfort, James E. Anderson, Timothy J. Wallington, Joule A. Bergerson, Deborah Gordon, Jonathan Koomey, Steven Przesmitzki, Inês L. Azevedo, Xiaotao T. Bi, James E. Duffy, Garvin A. Heath, Gregory A. Keoleian, Christophe McGlade, D. Nathan Meehan, Sonia Yeh, Fengqi You, Michael Wang, Adam R. Brandt

IAEE International Association for Energy Economics

IAEE Energy Forum / Fourth Quarter 2019

Factoring Greenhouse Gas Emissions in Upstream Portfolio Decisions

BY FLORENT ROUSSET AND FERNANDO ROLLA

PETROLEUM ECONOMIST Independent Analysis For Energy Leaders

Alastair O'Dell
Senior Editor
5 February 2020

Carbon audits to ease stranded asset fears

The calculation of carbon intensity can be the starting point for making even seemingly uneconomic fields viable

The oil and gas industry would benefit from having a standardised method of calculating carbon intensity to support its investment decisions and smooth relations with financiers, investors and regulators, according to an industry authority on carbon management.

The traditional model of reserve-based lending, where a company's value and ability to borrow money is predicated on the estimated future value of its reserves, will increasingly be impacted by views of assets' carbon footprint in a world with a finite carbon budget, according to Nigel Jenvey, global head of carbon management at consultancy Gaffney, Cline & Associates (GCA).

In order to ensure the quality and independence of reserve estimates, third-party assessments have long had a role. "The same is now going on with emissions, as they become important indicator in the assessment of a company's value," he says.

Some hydrocarbon sources, such as Canadian oil sands, have attracted a negative public perception due to their perceived carbon intensity

Once carbon risk—in particular, the risk of future legislation and regulation making a find uneconomic—certain oil and gas discoveries can appear to become stranded assets.

"But it is not as simple as that," says Jenvey. "There are a lot of solutions that can be applied to counter original perceptions. That is really what we are trying to do—to derisk continued oil and gas investment during the energy transition."

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