Oil, Energy, and the Economy: Regional Trends & Future Projections

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1

Summary

- The latest Dallas Fed Energy Survey points to a modest increase in business activity in the oil and gas upstream sector, a continuing increase in capital expenditures, slowing growth in employment, and an improvement in the outlook.
- The price of West Texas Intermediate has declined from the highs seen in late September 2023 to $73/bbl. Global oil consumption growth has been slowing, U.S. production continues to increase, and Russian oil exports continue to flow with little to no declines.
- The global oil market is projected to be slightly oversupplied next year. Consumption growth is expected to be driven primarily by India and China.
- Solar to lead renewable growth in the power sector, as it has the lowest levelized cost of energy. However, significant investments are needed to get to net zero emissions by 2050.

2

ENERGY SURVEY RESULTS

Overview

Dallas Fed Energy Survey

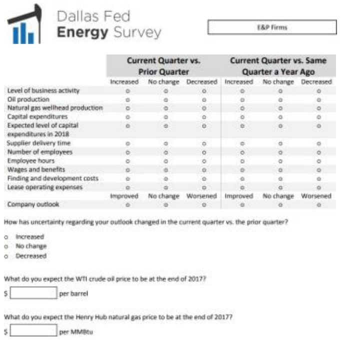
- Quarterly survey of upstream oil and gas firms headquartered in the 11th District (TX, parts of NM and LA)
- Survey is in its 7th year
- Roughly 200 firms participate, with an average response rate of 75%

"The quarterly energy survey by the Federal Reserve Bank of Dallas is required reading in oil and gas circles ..."
- Liam Denning, Bloomberg

Overview

Survey Design

- Designed survey with help from industry contacts
- Recurring key indicators every quarter
- Unique special questions each quarter
- Low burden: quarterly
- Panel overrepresents larger firms, underrepresents smaller firms


Dallas Fed Energy Survey

E&P Firms

	Current Quarter vs. Prior Quarter			Current Quarter vs. Same Quarter a Year Ago		
	Increased	No change	Decreased	Increased	No change	Decreased
Level of business activity	o	o	o	o	o	o
Oil production	o	o	o	o	o	o
Natural gas wellhead production	o	o	o	o	o	o
Capital expenditures	o	o	o	o	o	o
Expected level of capital expenditures in 2018	o	o	o	o	o	o
Supplier delivery time	o	o	o	o	o	o
Number of employees	o	o	o	o	o	o
Employee hours	o	o	o	o	o	o
Wages and benefits	o	o	o	o	o	o
Finding and development costs	o	o	o	o	o	o
Lease operating expenses	o	o	o	o	o	o
	Improved	No change	Worsened	Improved	No change	Worsened
Company outlook	o	o	o	o	o	o

How has uncertainty regarding your outlook changed in the current quarter vs. the prior quarter?

- o Increased
- o No change
- o Decreased

What do you expect the WTI crude oil price to be at the end of 2017?

$ ______ per barrel

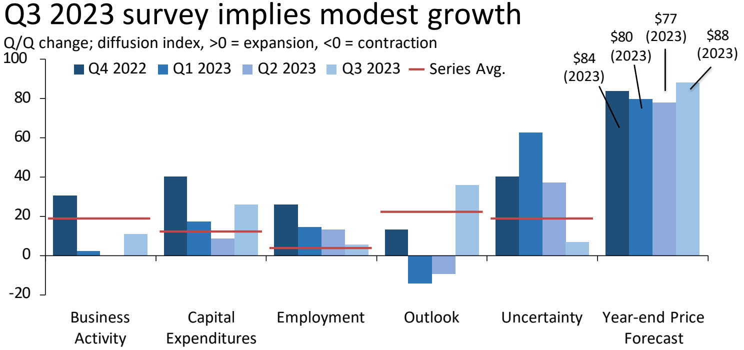
What do you expect the Henry Hub natural gas price to be at the end of 2017?

$ ______ per MMBtu

Results

Q3 2023 survey implies modest growth

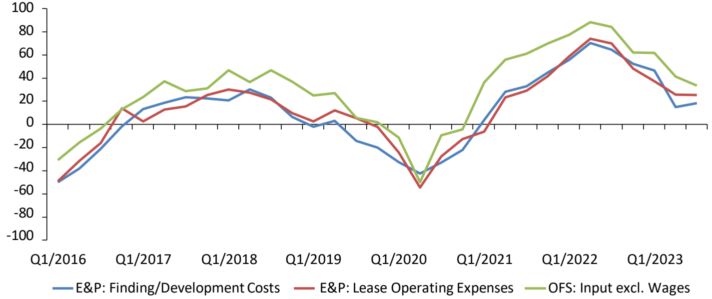
Q/Q change; diffusion index, >0 = expansion, <0 = contraction



Results

Cost increases moderate from 2022 pace

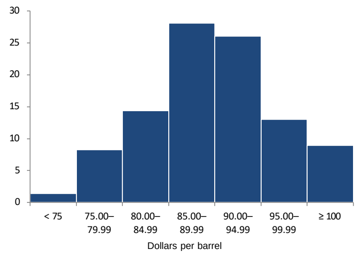
Q/Q change; diffusion index, >0 = expansion, <0 = contraction



Price forecast

Executives expect WTI at $88 per barrel at year-end

Q: What do you expect the WTI crude oil price to be at the end of 2023?

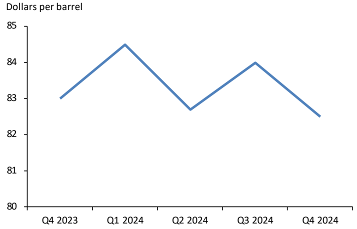


NOTES: Executives from 146 oil and gas firms answered this question during the survey collection period, Sept. 13–21, 2023. The average response was $88 per barrel. For reference, WTI spot prices averaged $90.29 per barrel during the period.

SOURCES: Federal Reserve Bank of Dallas; Energy Information Administration (ref. price).

Analysts expect prices next year near current levels

Forecasts for WTI ($/bbl) from a variety of sources

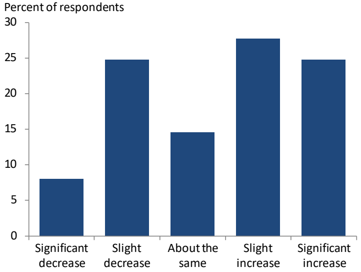


SOURCE: Bloomberg.

Special questions – Q3 2023

Executives expect 2050 demand to exceed current levels

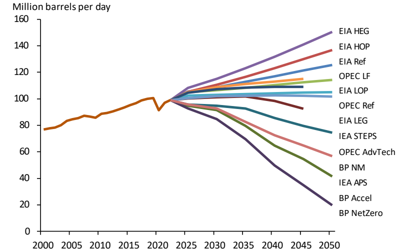
Q: How do you expect global oil consumption in 2050 to compare with current levels?



NOTE: Executives from 137 oil and gas firms answered this question during the survey collection period, Sept. 13–21, 2023.
SOURCE: Federal Reserve Bank of Dallas.

Scenarios mixed depending on future policy

Forecasts from a variety of sources

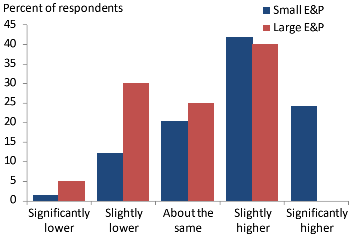


NOTES: HEG = High economic growth, HOP = high oil price, LF = Laizzez-Faire, LOP = low oil price, LEG = low economic growth, STEPS = stated policies, AdvTech = advanced technology, NM = new momentum, APS = announced pledges, Accel = Accelerated
SOURCE: EIA, IEA, OPEC, BP.

Special questions – Q3 2023

E&Ps expect D&C costs to be slightly higher in 2024

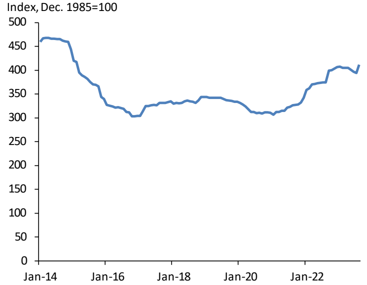
Q: What are your expectations for your firm's drilling and completion cost per well in 2024 versus 2023?



NOTES: Executives from 94 exploration and production firms answered this question during the survey collection period, Sept. 13–21, 2023. Small exploration and production (E&P) firms produced fewer than 10,000 barrels per day (b/d) in fourth quarter 2022, while large E&P firms produced 10,000 b/d or more. Responses came from 74 small firms and 20 large firms.
SOURCE: Federal Reserve Bank of Dallas.

Drilling PPI remains near multi-year high

Producer Price Index by Industry: Drilling Oil and Gas Wells: Primary Services



SOURCE: Bureau of Labor Statistics.

Special questions

Comments from executives provide color/sentiment

Exploration and Production (E&P) Firms

Investors still do not want oil and gas exposure despite healthy risk-adjusted returns. I don't think they are coming back. It's different this time.

Power distribution in the West Texas region is materially behind demand, and new power distribution construction is months to years behind schedule. Power distribution companies cannot keep their commitments on schedule. Growing West Texas power demand while power supply remains stagnant could lead to moderated oil and gas investment.

The current natural gas price is not sustainable for exploration or development for small operators.

Oil and Gas Support Services Firms

E&P companies must make an effort to partner with their service providers to promote win-win working relationships. U.S. upstream participants must sit on the same side of the table to overcome challenges and ensure that our industry remains healthy and stable.

E&P mergers are creating a much more efficient oilfield but certainly more concentrated customer base for equipment and service providers. The barriers to entry continue to increase for new service providers. At what point do federal regulators begin to scrutinize these mergers?

Special questions – Q2 2023

Majority expect little impact from credit tightening

Q: Have tighter credit conditions since February 2023 had an impact on your firm so far?

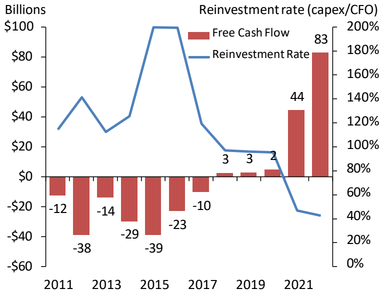
Percent of respondents	Small E&P	Large E&P	Services
No impact	58	58	45
Slight impact	18	33	40
Significant impact	24	8	15

Q: How do you expect tighter credit conditions to affect your business plans through the remainder of the year?

Percent of respondents	Small E&P	Large E&P	Services
No impact	43	38	31
Slight impact	35	50	45
Significant impact	22	13	24

NOTES: Executives from 96 exploration and production firms and 47/49 oil and gas support services firms answered this question during the survey collection period, June 7–15, 2023. Small E&P firms produced fewer than 10,000 barrels per day (b/d) in fourth quarter 2022, while large E&P firms produced 10,000 b/d or more. Responses came from 72 small firms and 24 large firms. Percentages may not sum to 100 due to rounding.

E&P continue to fund spending through free cash flow

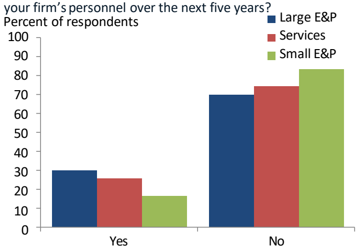


NOTE: Data collected from earning reports of 40 independent E&P production firms. Free cash flow calculated as operating cash flow minus capital expenditures.
Source: Bloomberg.

Special questions – Q2 2023

Most executives don't expect AI to impact staffing

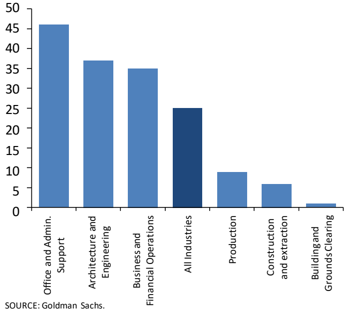
Q: Do you expect artificial intelligence to replace some of your firm's personnel over the next five years?



NOTES: Executives from 87 exploration and production firms and 47 oil and gas support services firms answered this question during the survey collection period, June 7–15, 2023. Small E&P firms produced fewer than 10,000 barrels per day (b/d) in fourth quarter 2022, while large E&P firms produced 10,000 b/d or more. Responses came from 67 small firms and 20 large firms. Percentages may not sum to 100 due to rounding.
SOURCE: Federal Reserve Bank of Dallas.

Manual jobs least likely to be impacted by generative AI

Share of industry employment exposed to automation

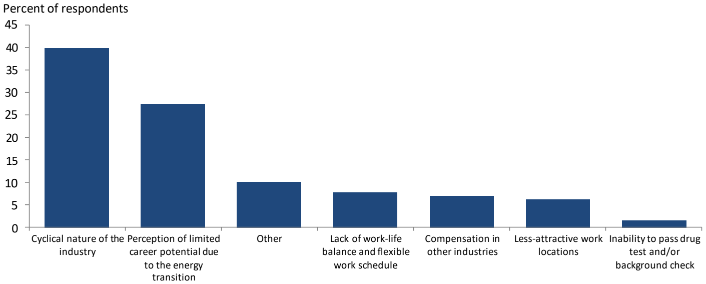


SOURCE: Goldman Sachs.

Special questions – Q1 2023

Commodity price volatility and perception of limited career potential look to be driving energy worker shortages

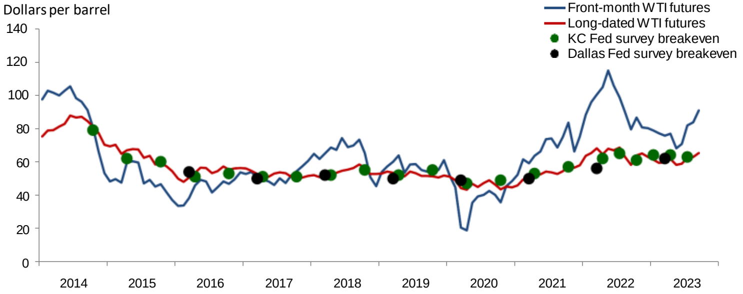
Q: Which of the following is the primary factor causing worker shortages in the oilfield?



NOTE: Executives from 128 oil and gas firms answered this question during the survey collection period, March 15–23, 2023.
SOURCE: Federal Reserve Bank of Dallas.

Special Questions – Q1 2023

Long-dated WTI futures near survey break-evens



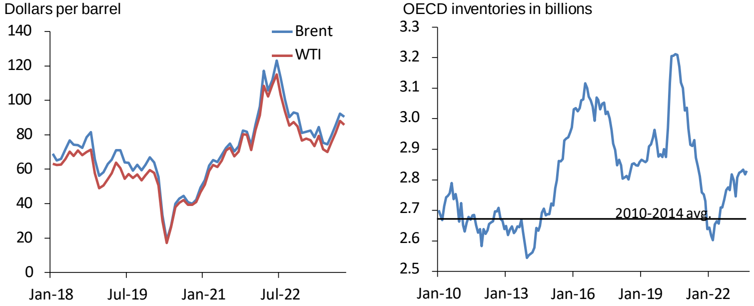
NOTE: The long-dated West Texas Intermediate (WTI) futures price is based off a 60th month contract. All prices are as of end of month.
SOURCES: Bloomberg; Federal Reserve Banks of Dallas and Kansas City.

Additional Insight: Breakeven Oil Prices Underscore Shale's Impact on the Market

GLOBAL OIL MARKET

Global Oil Market

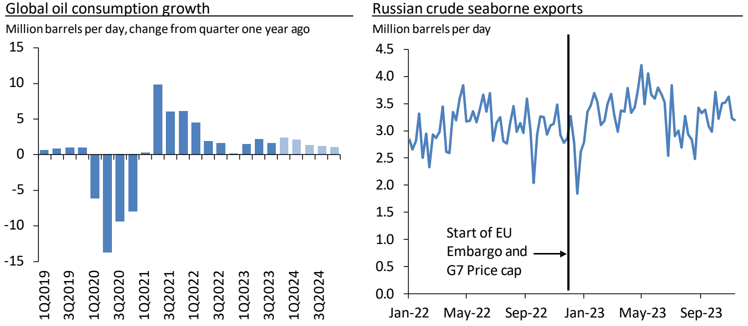
Crude oil prices have fallen since summer 2022 as inventories have risen



Note: The price for April 2023 is the spot price on April 13, 2023. All other pricing points are an monthly average.
Source: Energy Information Administration.

Global Oil Market

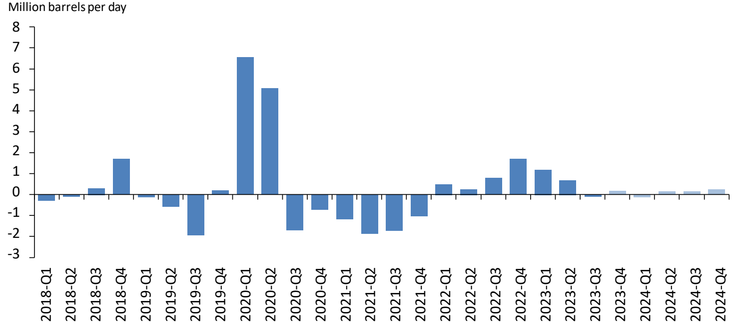
Oil prices declined since mid-2022 as consumption growth slowed, Russian exports resilient



SOURCE: Energy Information Administration, Bloomberg.

Global Oil Market

Supply-demand balances show slight increases in 2024

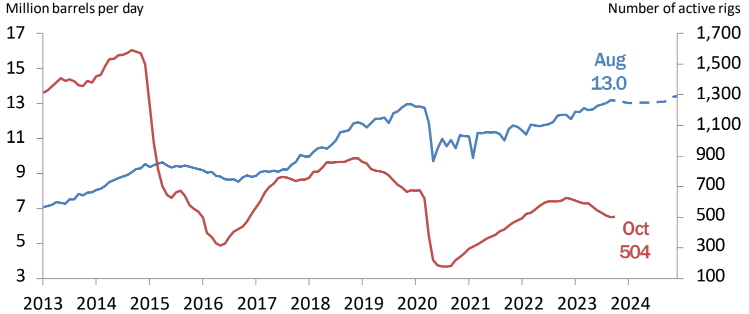


SOURCE: Energy Information Administration.

U.S. OIL MARKET

U.S. Oil Market

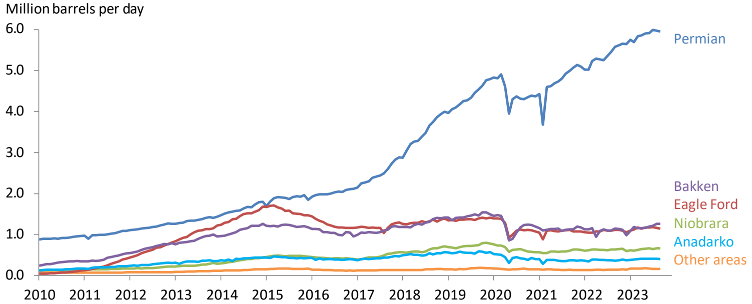
U.S. production inching higher, despite low number of rigs



NOTES: Dashed line shows the forecast as of 4/11/23. Rig count series shows the last weekly count each month.
SOURCES: Baker Hughes; Energy Information Administration.

U.S. Oil Market

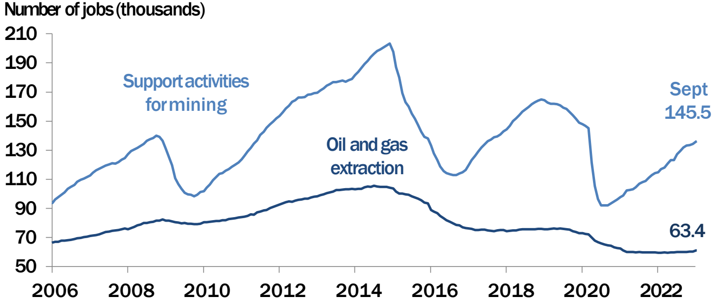
Permian Basin is main driver of oil production growth



NOTE: “Other areas” include Haynesville and Marcellus.
SOURCE: Energy Information Administration.

U.S. Oil Market

Texas oil and gas employment trending up

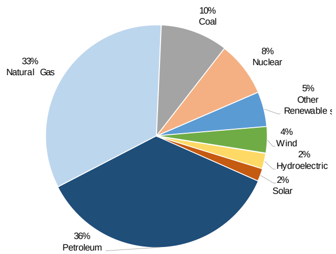


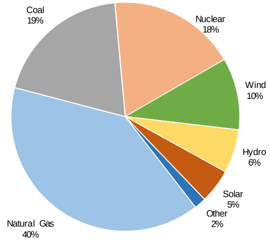
SOURCES: Bureau of Labor Statistics; Federal Reserve Bank of Dallas.

U.S. Energy Transition

Renewables

Wind and solar were 6% of U.S. Energy Consumption, 15% of U.S. power mix, in 2022



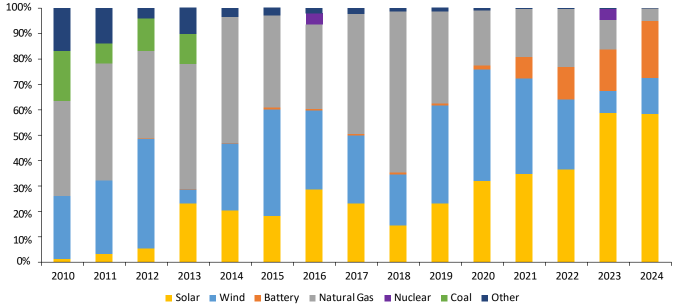


SOURCE: Energy Information Administration.

Renewables

Solar is the leading source of new generation capacity

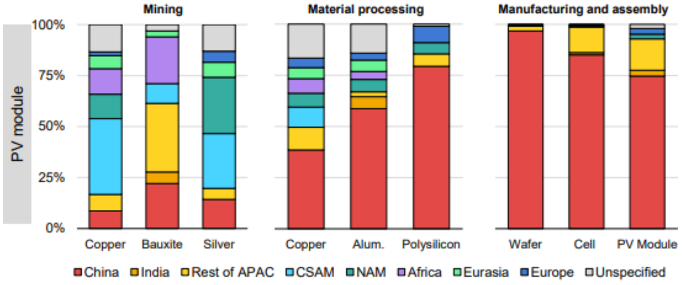
New capacity additions, as a percentage share



SOURCE: Energy Information Administration.

U.S. Renewables

However, most of solar supply chain is concentrated in China

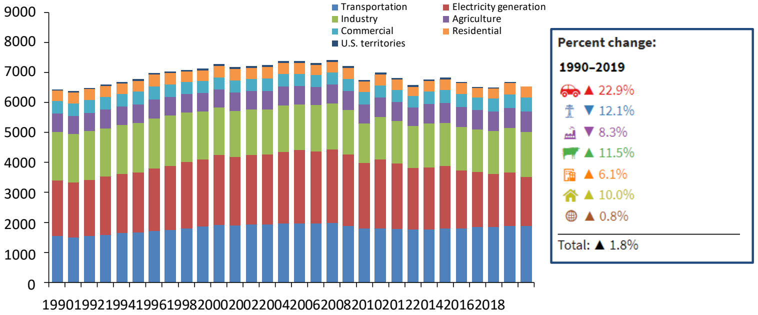


Source: International Energy Agency.

Renewables

Greenhouse emissions come from sectors outside power

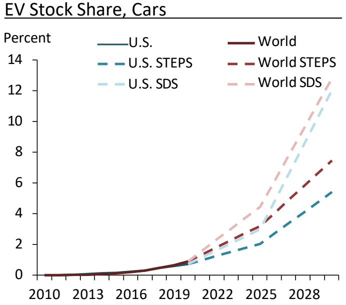
Emissions (million metric tons of carbon dioxide equivalents)



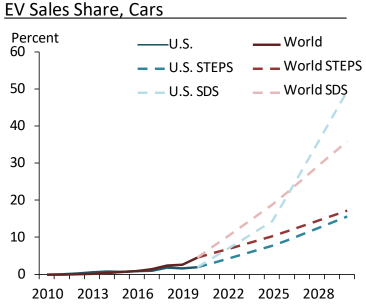
SOURCE: EPA.

Renewables

Electric vehicles make up 5% of U.S. car sales, 1% of vehicle stock



Note: STEPS stands for Stated Policies Scenario and SDS stands for sustainable developm
SOURCE: IEA (Global EV Outlook 2022).



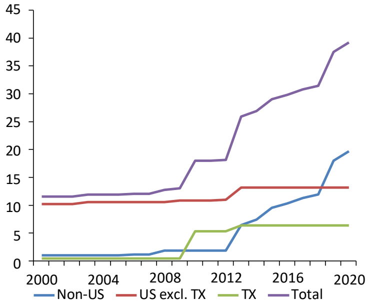
Note: STEPS stands for Stated Policies Scenario and SDS stands for sustainable developme
SOURCE: IEA (Global EV Outlook 2022).

29

Renewables

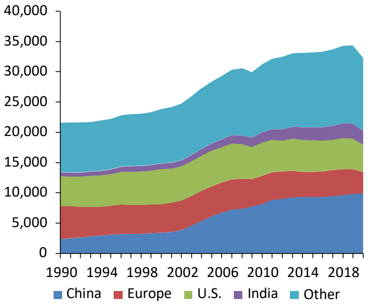
CCUS capacity in operation is limited so far compared to global emissions

Capacity in million tons per annum



SOURCE: Global CCS Institute.

Emissions in million tons per annum of CO_2

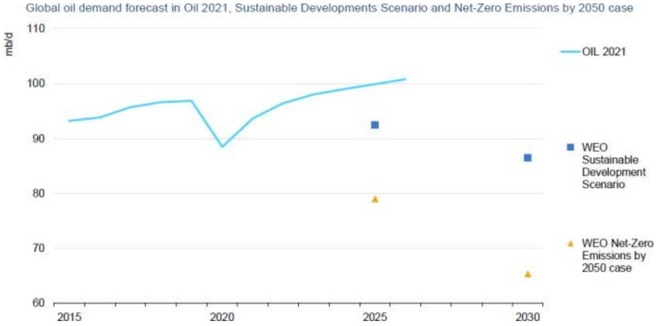


SOURCE: BP Statistical Review.

30

Renewables

Deeper cuts in fuel consumption or new technology needed to meet net-zero goals



SOURCE: IEA World Energy Outlook.