Energy Crisis Redux:

Repeat of the 1970s, or a Short Bumpy, Road to Green?

Onshore Energy Conference London
2 November 2021

Robert P. Hartwig, PhD, CPCU

Clinical Associate Professor of Finance, Risk Management & Insurance

Darla Moore School of Business ♦ University of South Carolina

Robert.Hartwig@moore.sc.edu ♦ +1 803.777.6782

UNIVERSITY OF
SOUTH CAROLINA
Darla Moore School of Business

Overview

- Past as Prologue: Back to the Bad Old Days of the 1970s?
  - Energy Economics: Much has changed over the past half century
- Has the World Bungled its First Test in its Transition to a Green Future?
  - Will "Green Energy Scares" become a persistent global economic concern?
- Reasons to Be Optimistic
  - But challenges remain—energy, Covid, supply chain
- Energy Sector Market Overview and Outlook
  - Looking Ahead: Climate Change, COP26 and More…
  - Energy market supply, demand, investment opportunities and threats
  - Insurance implications
- Q&A

The Global Energy Shock of 2021

- Energy prices around the world are up sharply in 2021
  - Brent: + 66.8%; WTI: +72.2% as of 31 Oct.
- Spot shortages in some areas
- Rising inflation
- A resurgent OPEC, Russia
- Huge drop in oil and gas investment
- Political unrest
- Concerns about economic growth
- ***All of this amid…***

The Global Energy Shock of 2021

- **COP26: UN Climate Change Conference**
  - **Glasgow: 31 Oct. – 12 Nov. 2021**
- **25,000 delegates from 200 countries**
- **Objective: *"To accelerate action towards the goals of the (2015) Paris Agreement and the UN Framework on Climate Change." --UN***
- **Popular Perception: How to get the world to Net Zero Emissions (NZE) by 2050?**
  - ***And how much will it cost?***
- **Conference occurs during a difficult period as the world emerges from the economic turmoil of the Covid-19 pandemic**

THE GLOBAL ECONOMY, ENERGY AND INSURANCE

Global Growth Prospects Depend Fundamentally on the Pace and Success of Vaccination Campaigns

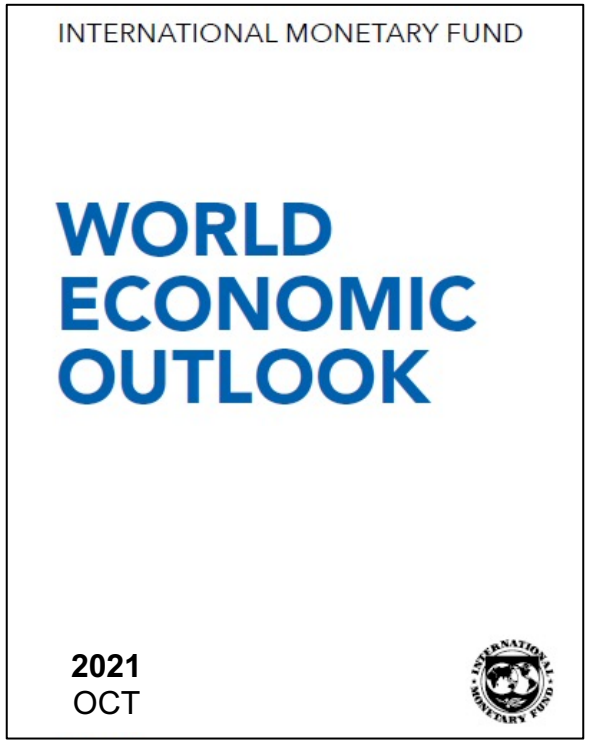
Energy Prices, Inflation, Exchange Rates and Trade All Hang in the Balance—So Too Does Insurance

5

Global Concerns Mount Amid Uncertainty: Energy & Insurance Market Impacts

- **2021 began with optimism amid vaccine rollouts, putting and end to the pandemic in sight, but…**

- **Numerous challenges emerged, including Covid variants, supply chain disruptions, energy supply concerns and more that impacted consumer and business confidence, which, in turn drive:**
  - **The trajectory of real GDP growth**
  - **International trade and capital flows**
  - **Inflation (and inflationary expectations)**
  - **Interest rates**
  - **Exchange rates**
  - **Financial market volatility**
  - **Energy prices**
  - ***AND…Insurance demand***



Global Growth Concerns: Energy and Insurance Market Impacts

- **There are major implications for Energy and Insurance markets alike**
  - Supply
  - Demand
  - Price
  - Investment (Upstream and Downstream)
  - Regulatory Environment
  - Climate
  - Geopolitical Implications

- **But to understand the many implications, we need to understand the underlying economic drivers and the associated geopolitical environment**

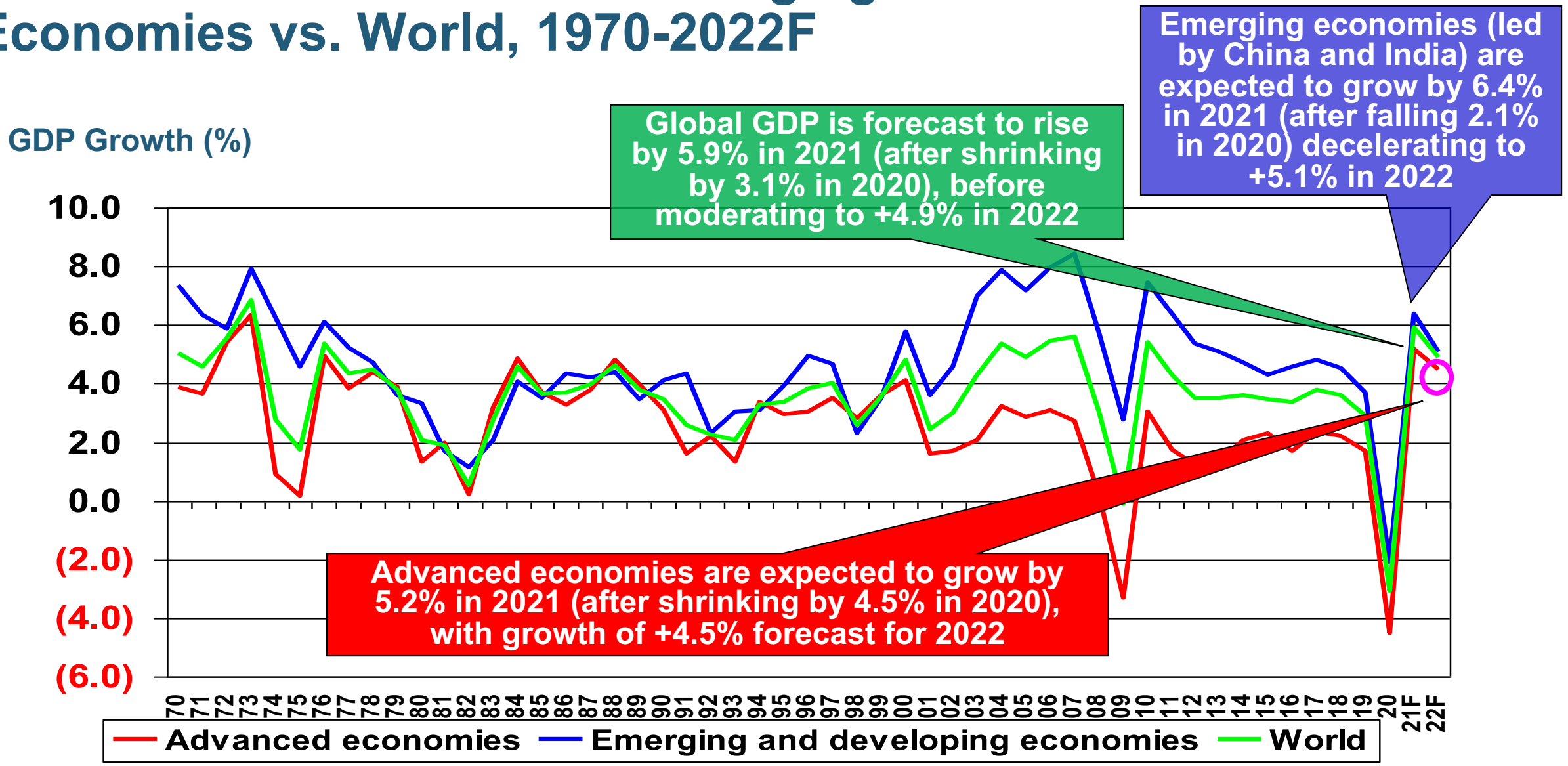
ECONOMIC OPTIMISM HAS BOTH SURGED AND SUNK IN 2021

Inflationary Expectations and Interest Rates Are Drifting Higher Based on View that Global Economic Recovery Will Continue and Higher Energy, Commodity and Labor Costs

BUT…One Malady that Will Last Far Longer than COVID Itself: Debt

8

GDP Growth: Advanced & Emerging Economies vs. World, 1970-2022F



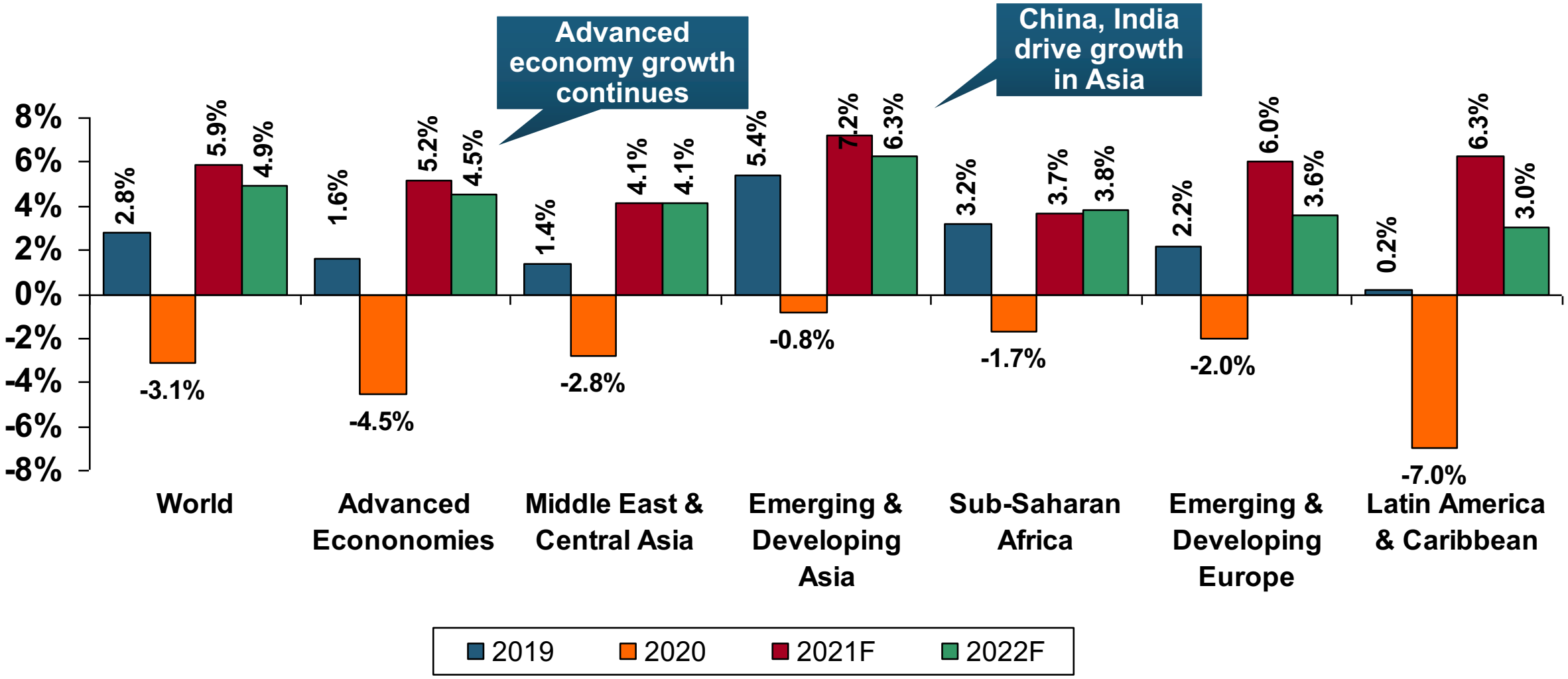
Source: International Monetary Fund, *World Economic Outlook*, Oct. 2021;
Univ. of South Carolina, Risk and Uncertainty Management Center.

Global Growth Concerns: Where Are the Weaknesses and Why?

Six Major Sources of Weakness

1. **Energy Inflation**
2. **Ongoing Supply Chain Disruptions (e.g., computer chips, commodities)**
3. **Slow Covid Vaccine Rollout in Developing World**
4. **Inflation, Currency Depreciation/Devaluations, Capital Flight (EMs)**
5. **US – China Military/Political Tensions: A New Cold War?**
6. **Protectionism**
7. **Rapidly Rising Sovereign Debt Burdens**

Real GDP Growth Forecasts: Major Regions: 2019 – 2022F



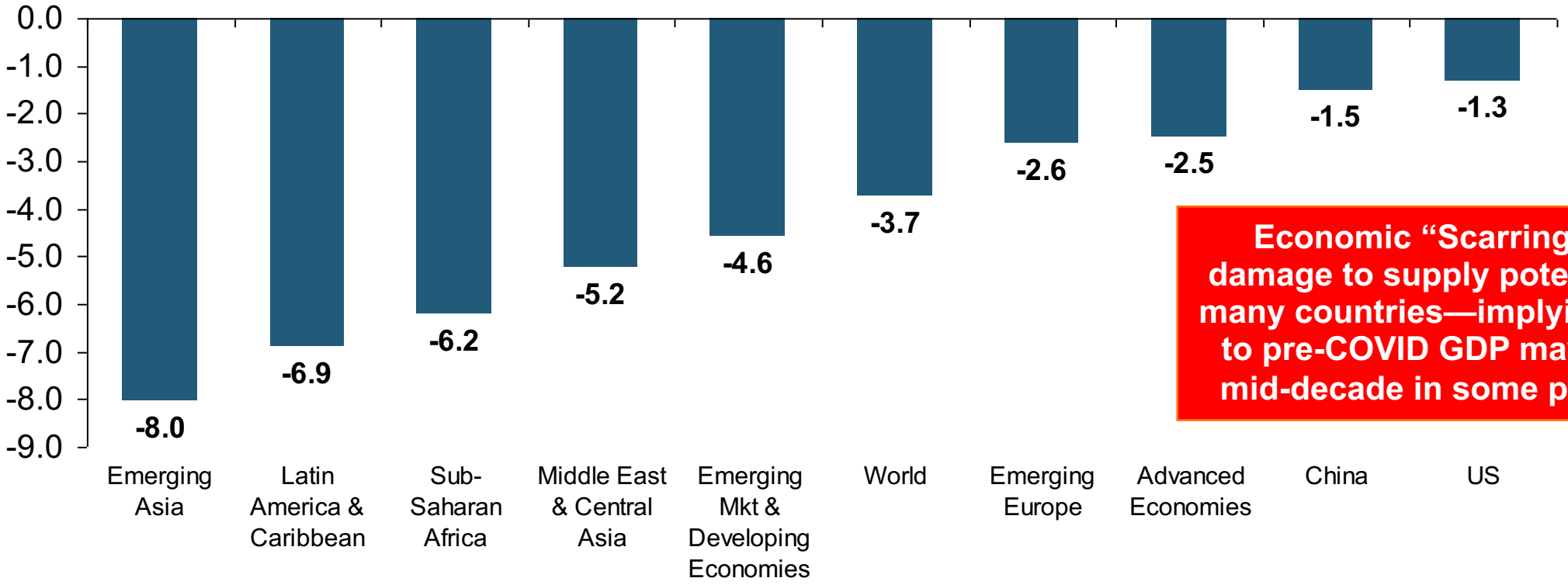
Global Growth Prospects Vary Widely by Region as Economies Work to Recover Growth Lost to COVID. Global Supply Chain Problems and Higher Inflation Have Reduced *Real* Growth Forecasts

Source: International Monetary Fund, *World Economic Outlook*, Oct. 2021; Univ. of South Carolina, Risk and Uncertainty Management Center.

GDP Losses Relative to Pre-COVID by Region

(Current 2022 forecast vs. pre-COVID forecast, percent difference)

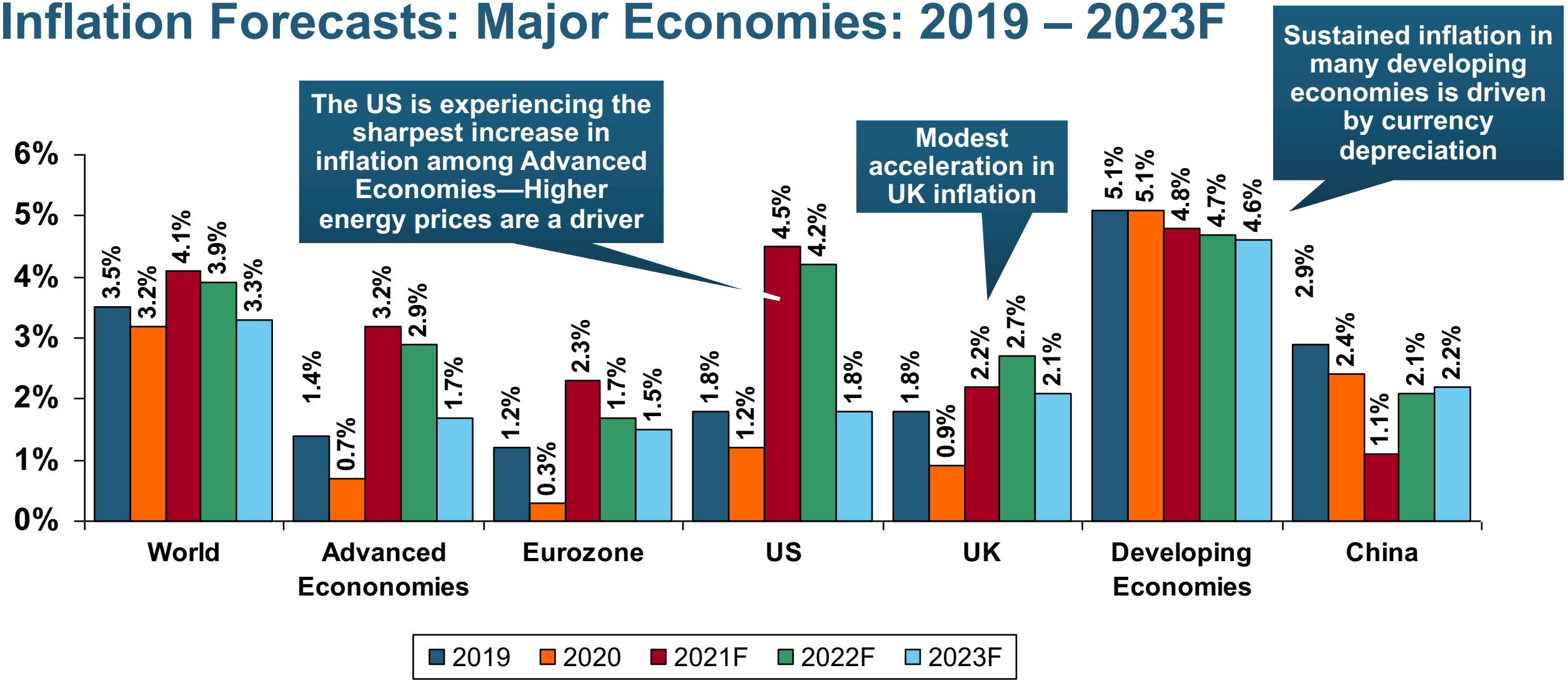
GDP losses are the most substantial in Emerging Economies



Economic "Scarring" – persistent damage to supply potential is evident in many countries—implying that the return to pre-COVID GDP may not occur until mid-decade in some parts of the world

Source: International Monetary Fund, *World Economic Outlook*, Oct. 2021 accessed at: https://www.imf.org/en/Publications/WEO/Issues/2021/10/12/world-economic-outlook-october-2021. Univ. of South Carolina, Risk and Uncertainty Management Center.

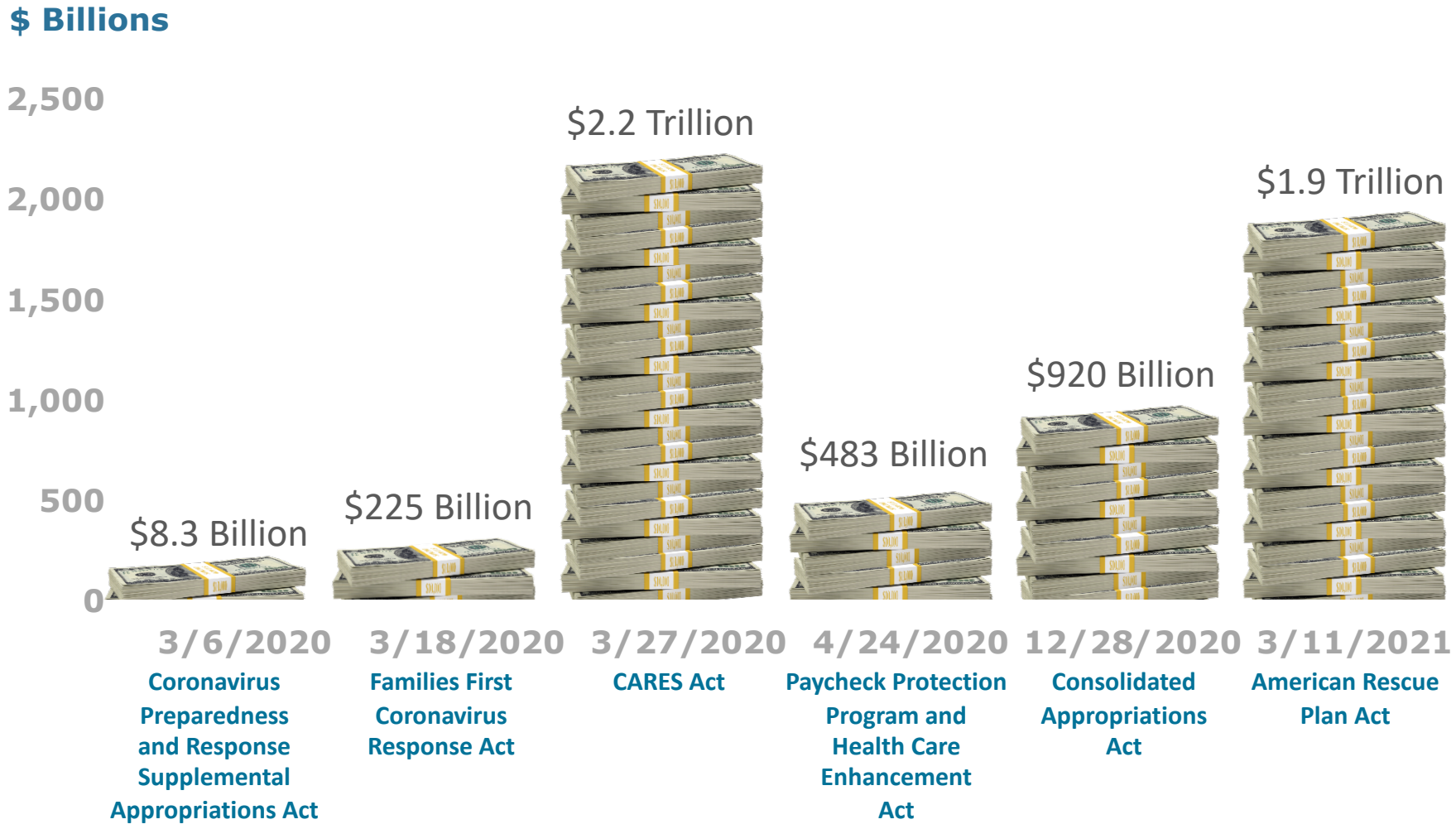
Inflation Forecasts: Major Economies: 2019 – 2023F



Higher Energy Prices, Supply Chain Disruptions, Labor Shortages Are Driving Inflation Higher; Currency Pressure Is a Problem in Developing Economies (More expensive imports, dollar denominated debt…)

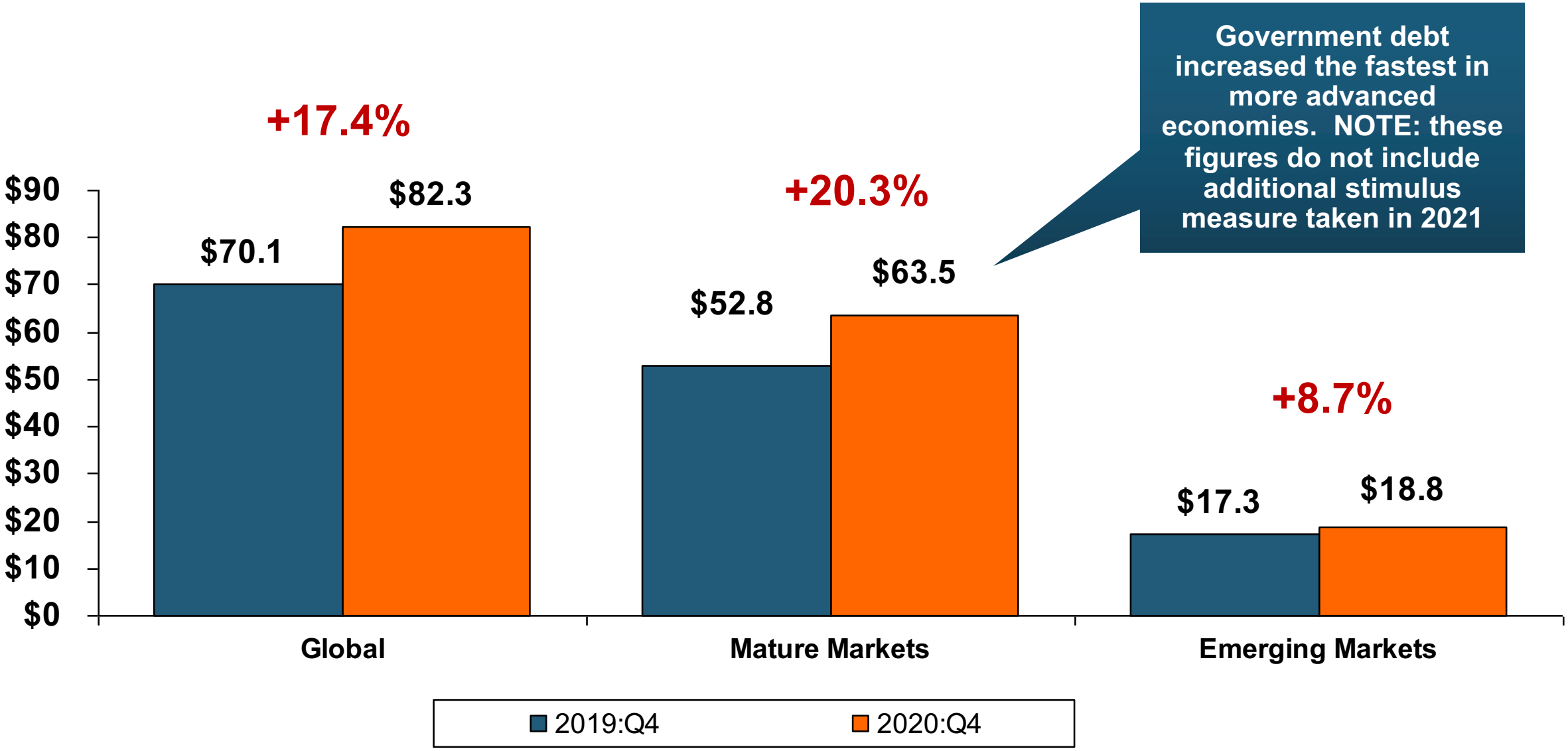
Source: IMF and Wells Fargo Securities (Oct. 2021); Univ. of South Carolina, Risk and Uncertainty Management Center.

COVID-19 Stimulus Plans



To date, Congress has passed 6 COVID-19 relief bills, providing as much as $5.7 trillion in assistance

Increase in Government Debt: 2019:Q4 – 2020:Q4 ($ Trillions)

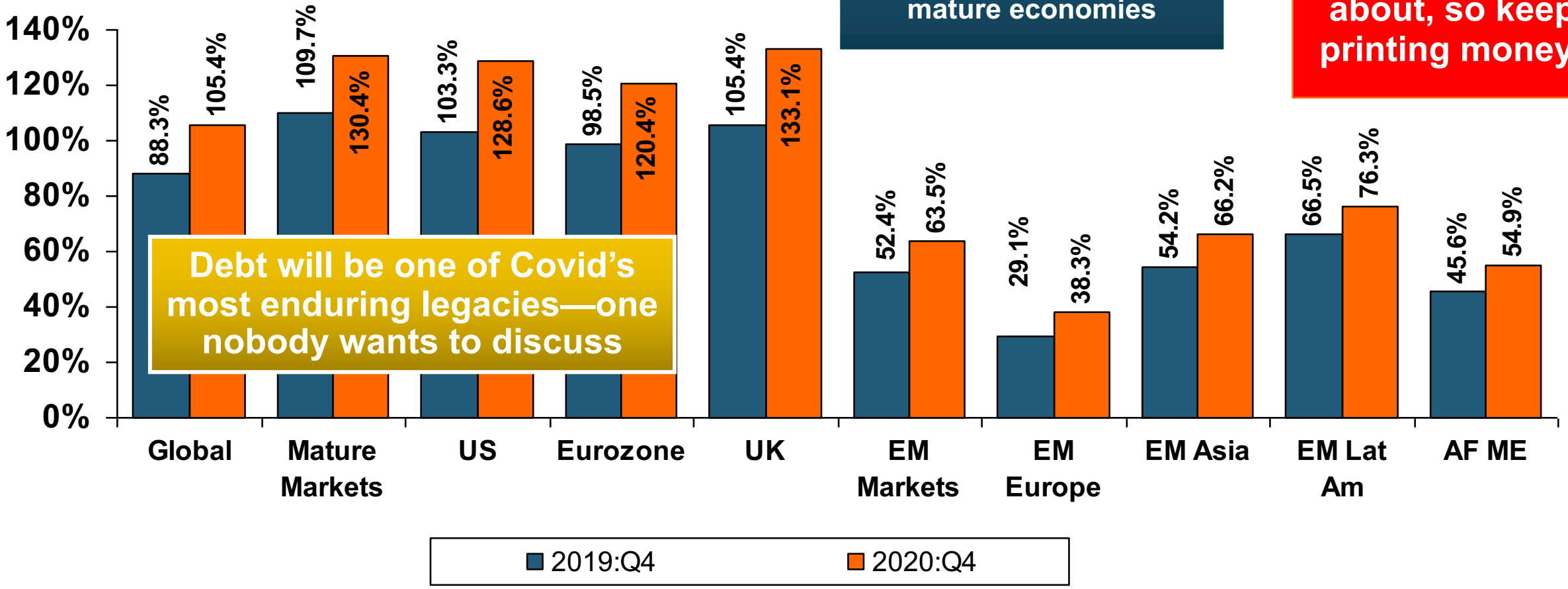


Source: Institute for International Finance, *Global Debt Monitor* (Feb. 17, 2021) accessed at https://www.iif.com/Portals/0/Files/content/Global%20Debt%20Monitor_Feb2021_vf.pdf ; Univ. of South Carolina, Risk and Uncertainty Management Center.

Change in Debt-to-GDP Ratios: 2019:Q4 – 2020:Q4

Debt-to-GDP ratios soared around the globe as countries spent heavily on stimulus, especially in mature economies

Adherents to Modern Monetary Theory (MMT) believe there is nothing to worry about, so keep printing money!



Debt will be one of Covid's most enduring legacies—one nobody wants to discuss

Source: Institute for International Finance, *Global Debt Monitor* (Feb. 17, 2021) accessed at https://www.iif.com/Portals/0/Files/content/Global%20Debt%20Monitor_Feb2021_vf.pdf ; Univ. of South Carolina, Risk and Uncertainty Management Center.

Energy Sector Outlook

COVID-19 Sapped Energy Demand and Drove Supply Cuts in 2020…But Demand and Price Are Roaring Upward

Renewables, Natural Gas, Crude, Coal

Climate Change and Inflation Are Dominating the Energy Debate Today

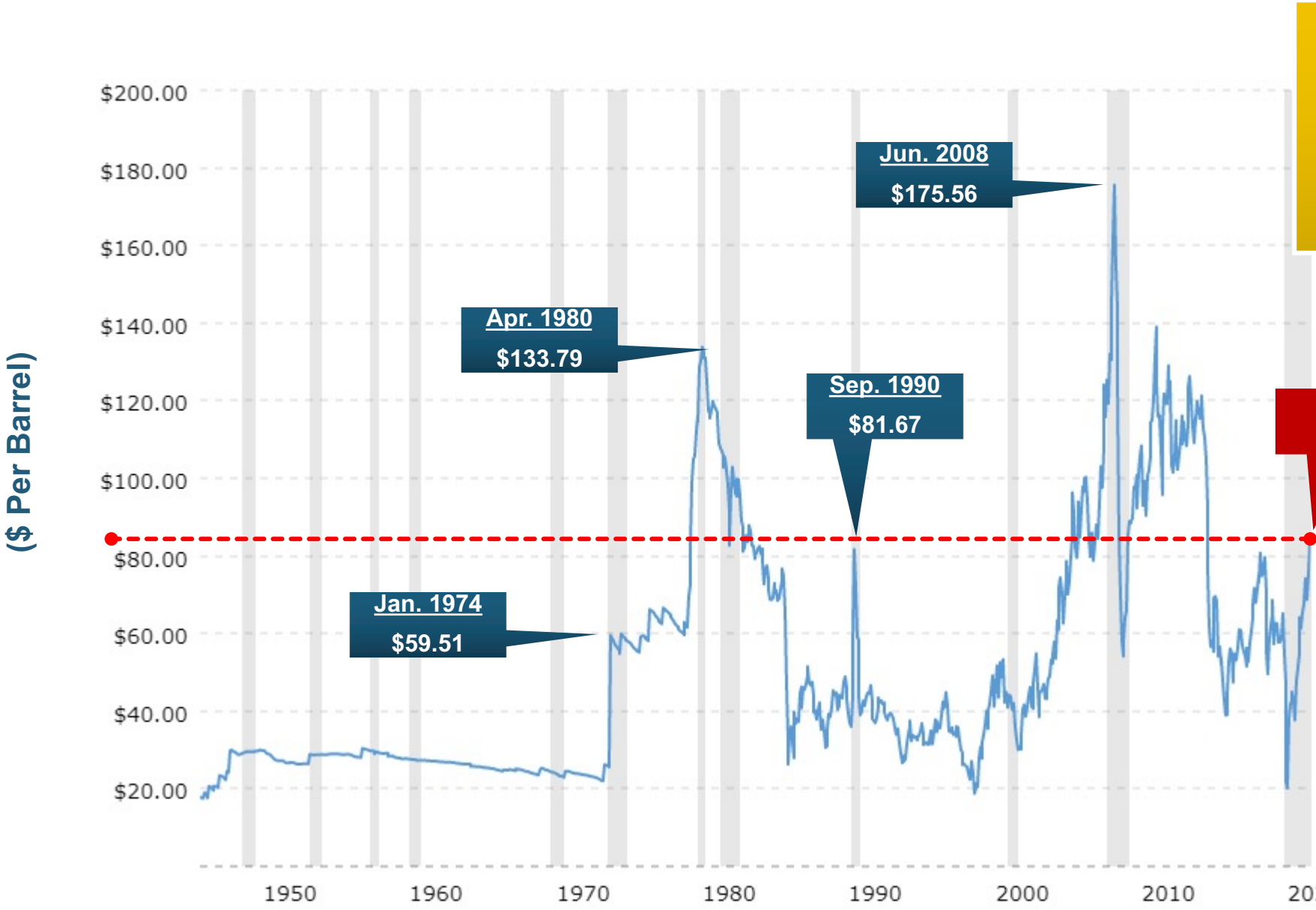
18

2021: 1970s Redux?

Why 2021 is Not a Repeat of the 1970s

- Energy price spikes caused recessions in 1974, 1979, 1990 but not in 2021 (2020 recession entirely due to Covid-19)
- Stagflation? Inflation is elevated, but likely transitory. Inflationary expectations (e.g., via bond yields) are modest.
- Global energy supplies are far more diversified than in the 1970s
- Energy intensity (energy per unit of GDP) much higher today than in the 1970s
- We know that the OPEC cartel is inherent unstable and that members will cheat

Crude Oil Prices (Inflation Adjusted): Jan. 1946 – Oct. 2021F*

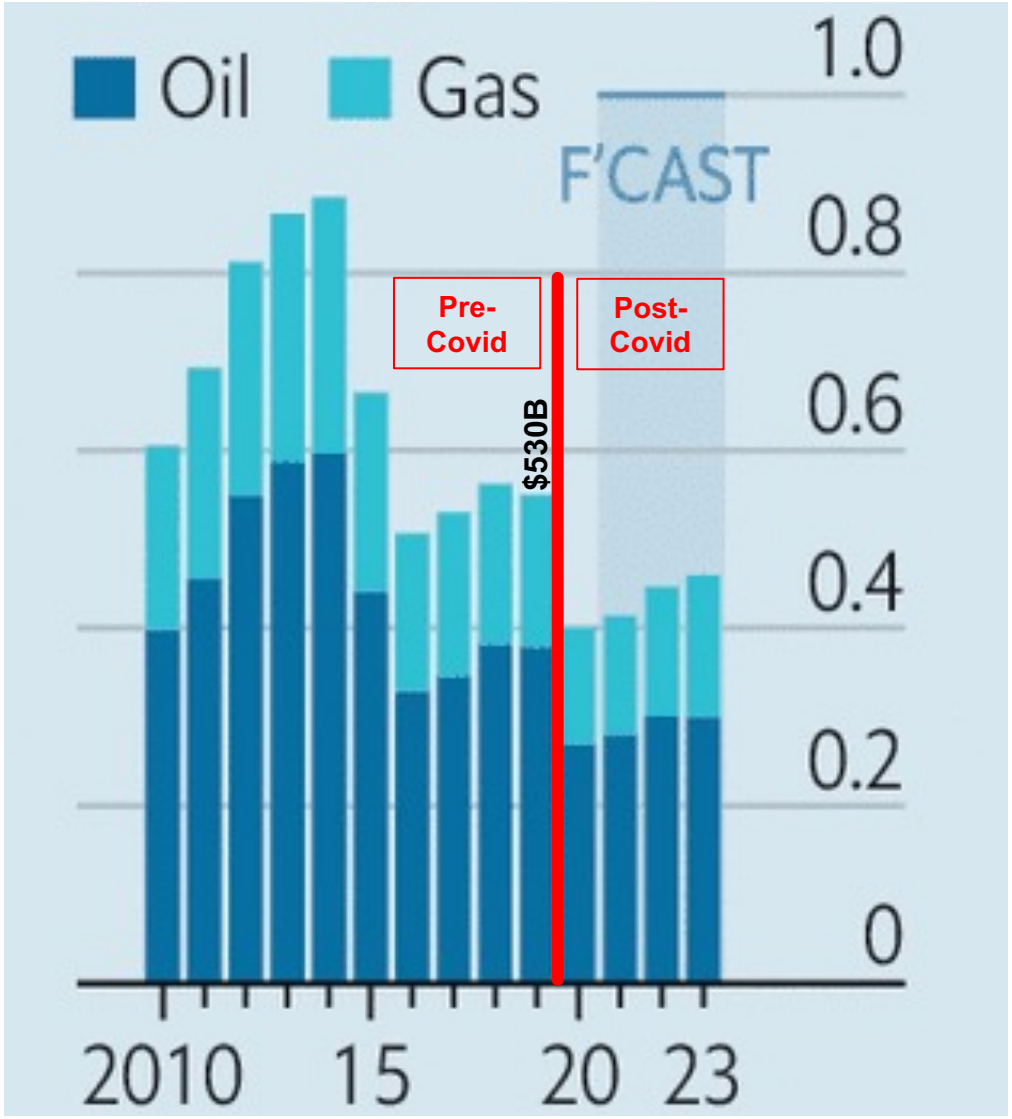


Strengthening global economy
OPEC and Russian output caps
Mideast uncertainty, Geopolitica
unrest, production bottlenecks
speculation and declines in
upstream investment

Spot Price: 1-Nov.
WTI: $84.74
Brent: $84.78

*West Texas Intermediate crude. 2021 data are through October.
Source: Macrotrends.net. Accessed 11/1/21 at: https://www.macrotrends.net/1369/crude-oil-price-history-chart.

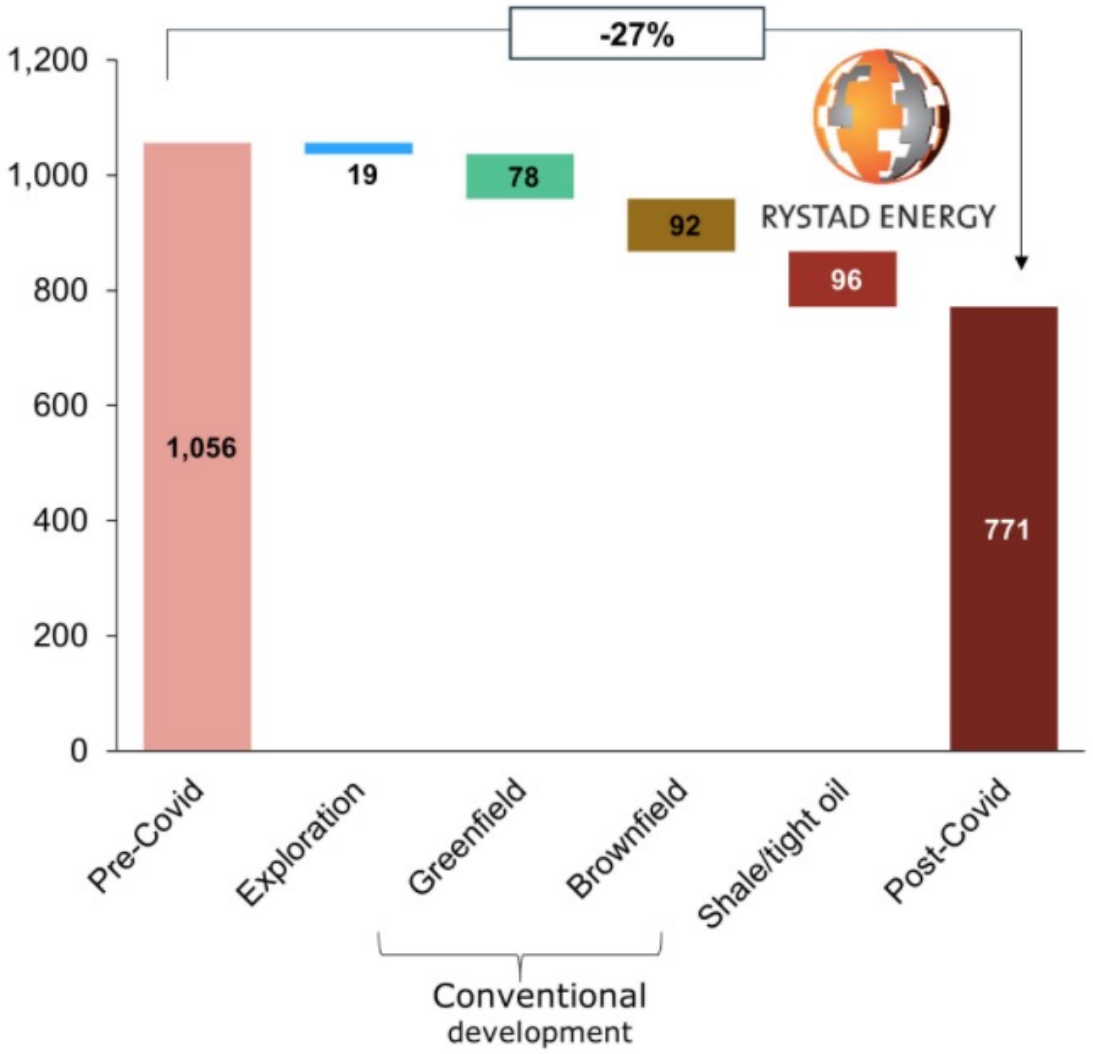
Worldwide Upstream Oil and Gas Investment: 2020 – 2023 ($ Trillions)



- Global upstream oil & gas investment was slashed by $145B in 2020 and $140B in 2021 (est.) to ~$380B - $385B from pre-Covid level investment of $530B in 2019
- Investment is unlikely to recover anytime soon.
- Forecast calls for upstream investment to reach $481B in 2025, still 9% below pre-Covid
- Big Question: Amid high O&G prices, why won't energy firms restore investment quickly as they have in the past?

Source: The Economist (16 Oct. 2021) from Rystad Energy Ucube.

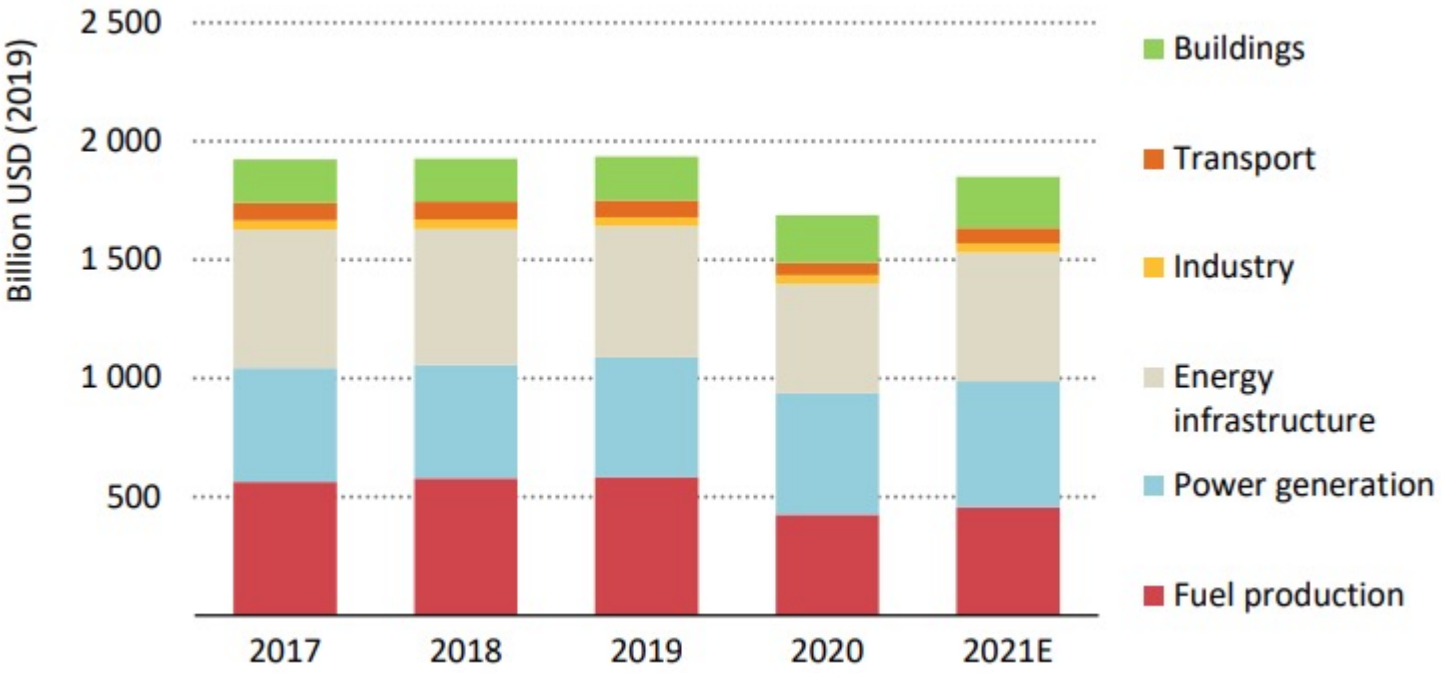
Decrease in Upstream Oil and Gas Investment by Supply Source: Total for 2020 and 2021 ($ Billions)



- Of $1,056B in upstream O&G investment planned pre-Covid for 2020 and 2021, investment was cut by (est.) $285B (27%) to $771B
- Shale/Tight Oil accounted for nearly 1/3 ($96B) of the decline in investment
- Because shale/tight oil is the supply source in greatest need of continuous reinvestment to keep production growing, the immediate impact on output (and price) from this sector has been significant

Source: Rystad Energy.

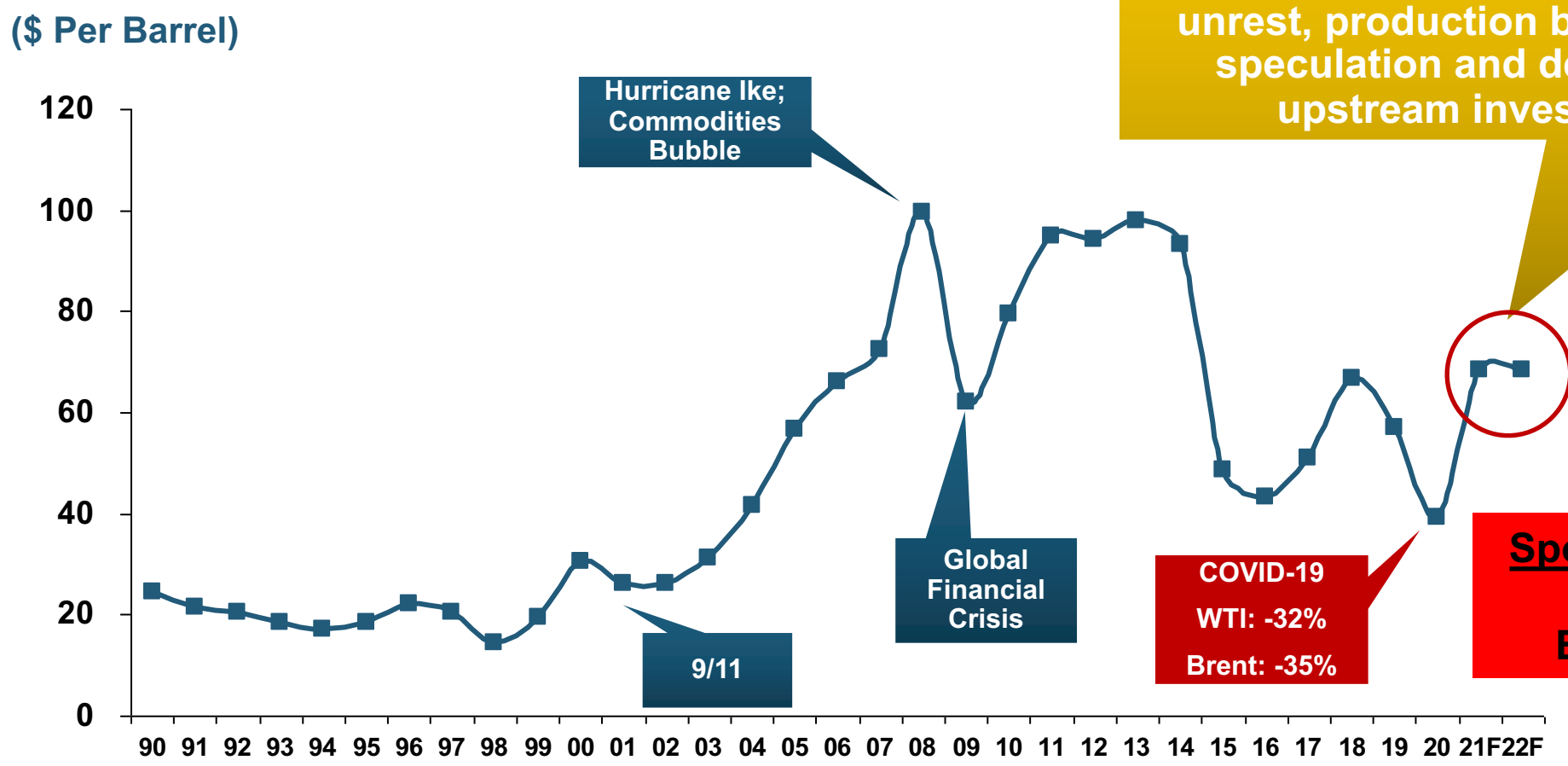
Global Energy Investment, 2017 – 2021E



- Energy investment declined by about 15% in 2020
- Majority of investment decline was due to cuts in production-related investments, given weak demand and plunging prices
- Adverse exposure impact on insurers
- Partial rebound in 2021 as energy demand and prices recover

Source: International Energy Agency, World Energy Investment 2021, accessed 11/1/21 at: https://www.iea.org/topics/investment ; University of South Carolina Risk Management and Uncertainty Center.

Crude Oil Prices: 1990 – 2022F*



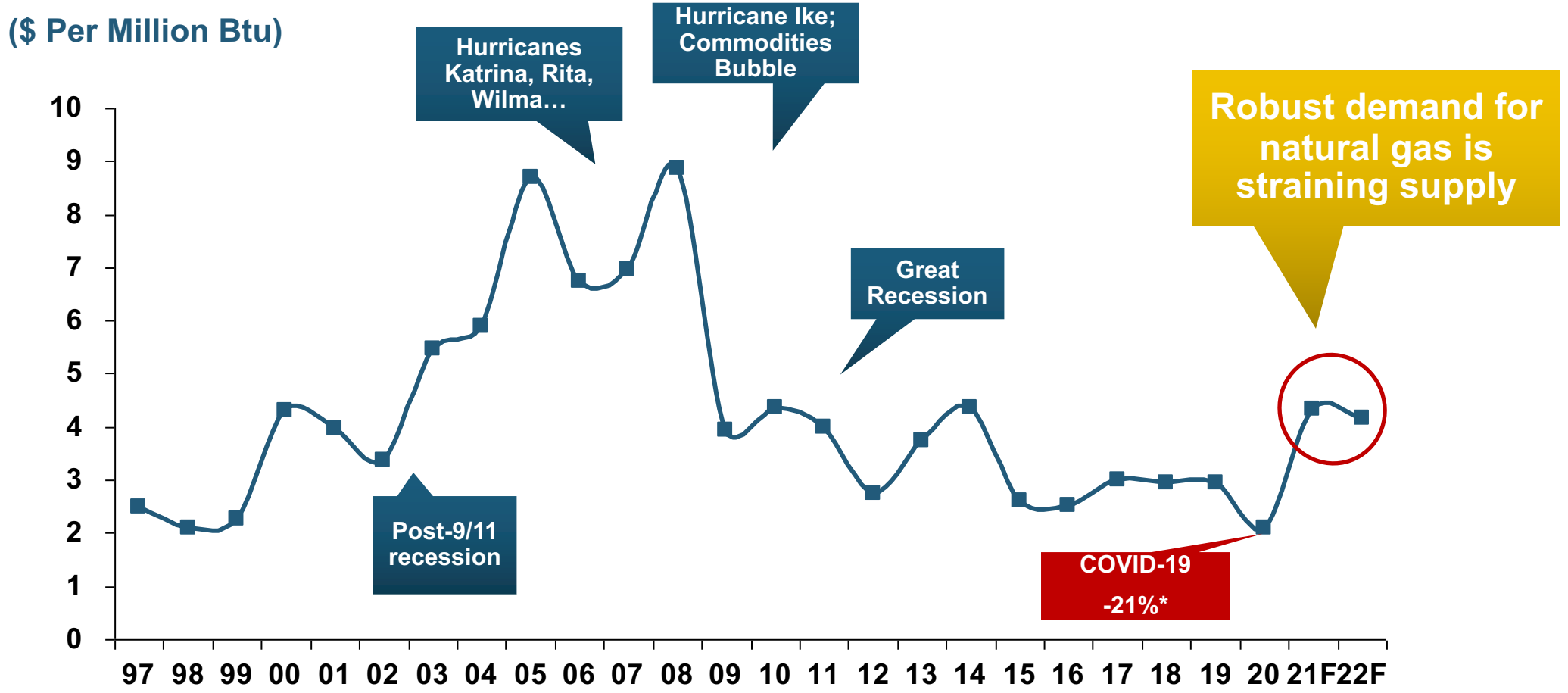
Strengthening global economy, OPEC and Russian output caps, Mideast uncertainty, Geopolitical unrest, production bottlenecks, speculation and declines in upstream investment

Spot Price: 1-Nov.
WTI: $84.74
Brent: $84.78

Crude Oil Pricing Is Recovering from its COVID-19 Collapse

*West Texas Intermediate. Source: US Energy Information Administration, Short-Term Energy Outlook, Oct. 13, 2021: https://www.eia.gov/outlooks/steo/marketreview/crude.php

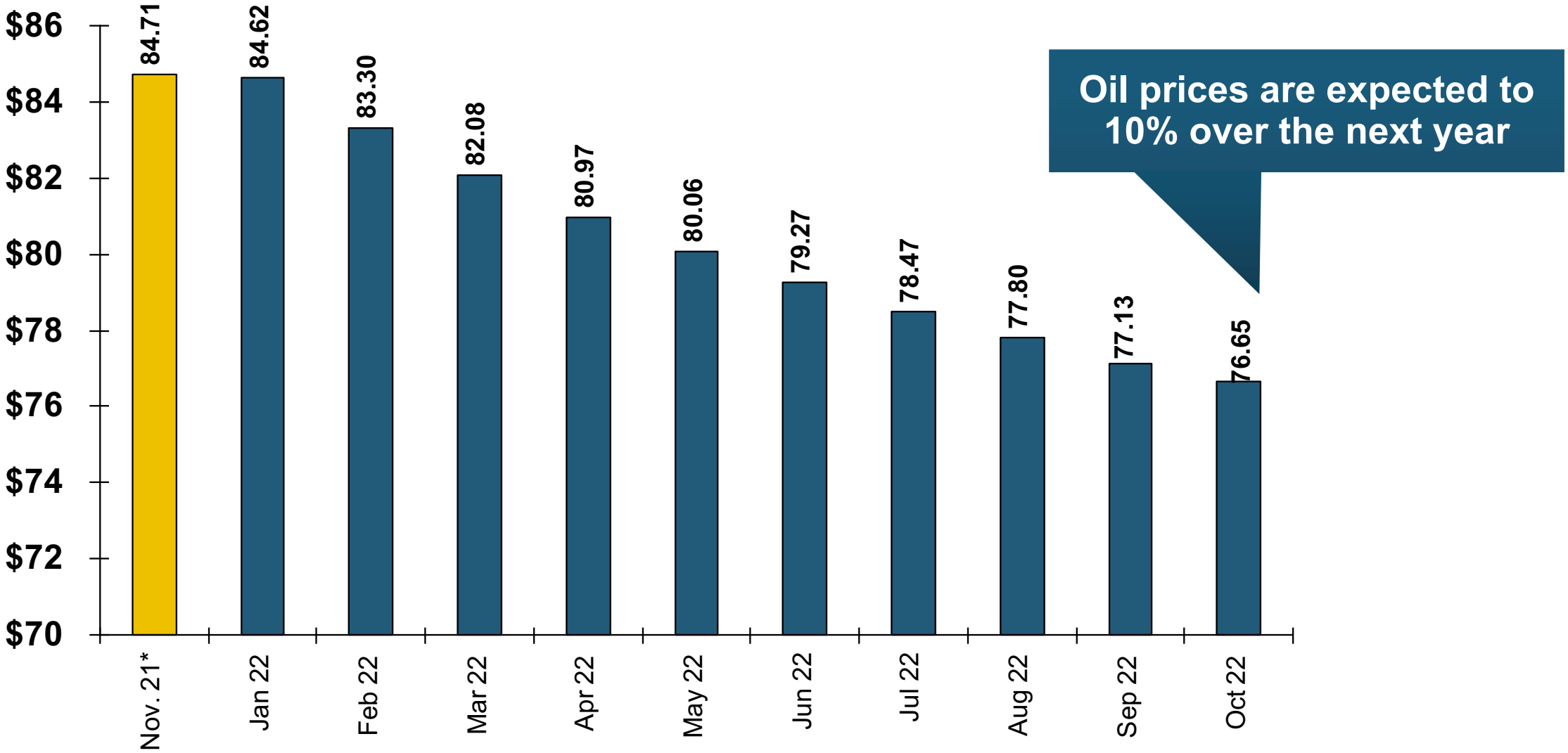
Natural Gas Prices: 1990 – 2022F*



Natural Gas Prices Have Remained Quite Stable in Recent Years, in Contrast to Crude Oil Prices

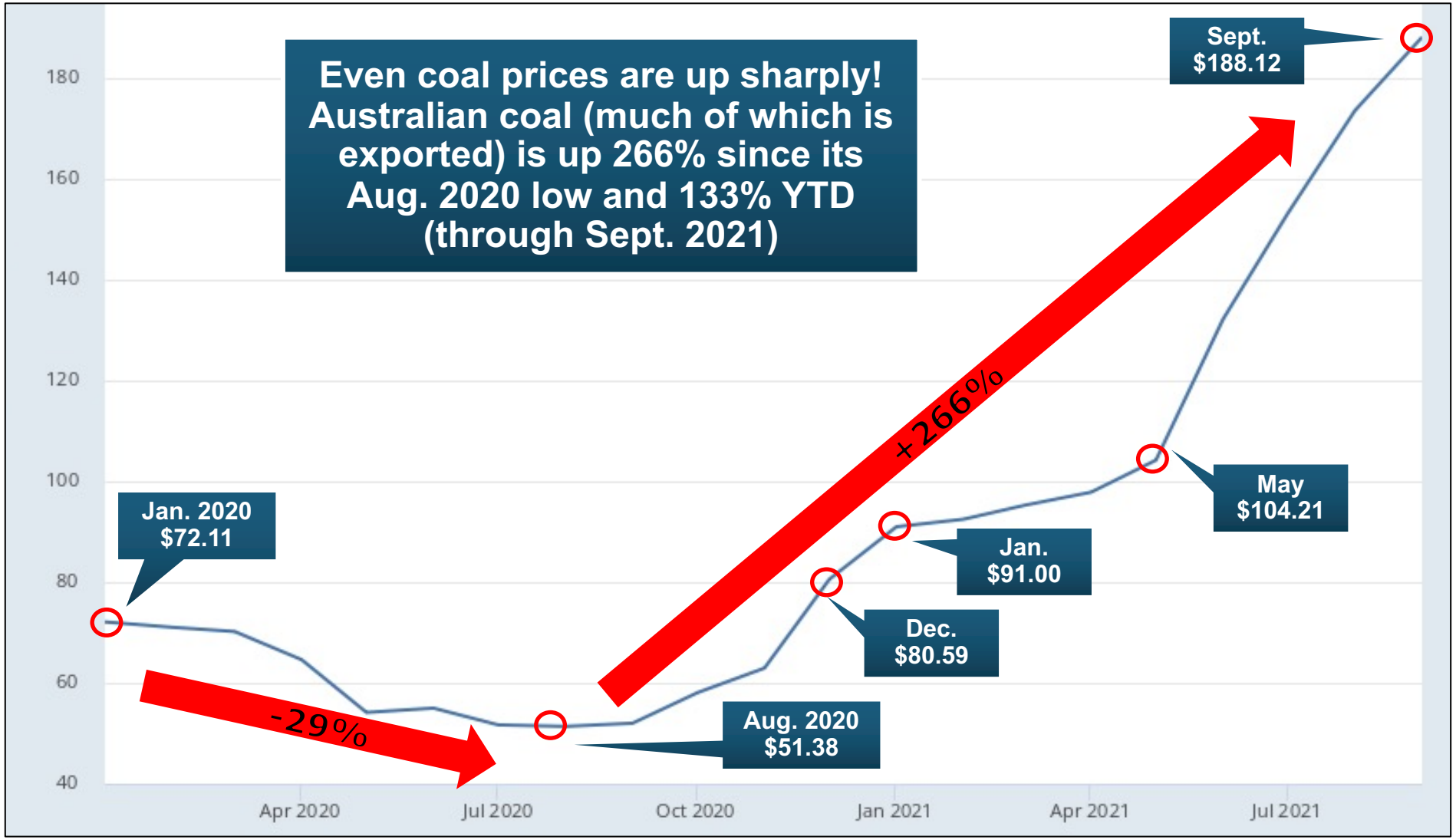
*Henry Hub natural gas spot price. Source: US Energy Information Administration, Short-Term Energy Outlook, Oct. 13, 2021: https://www.eia.gov/outlooks/steo/marketreview/crude.php .

Brent Crude Oil Futures Prices: Jan. 2022 – Oct. 2022



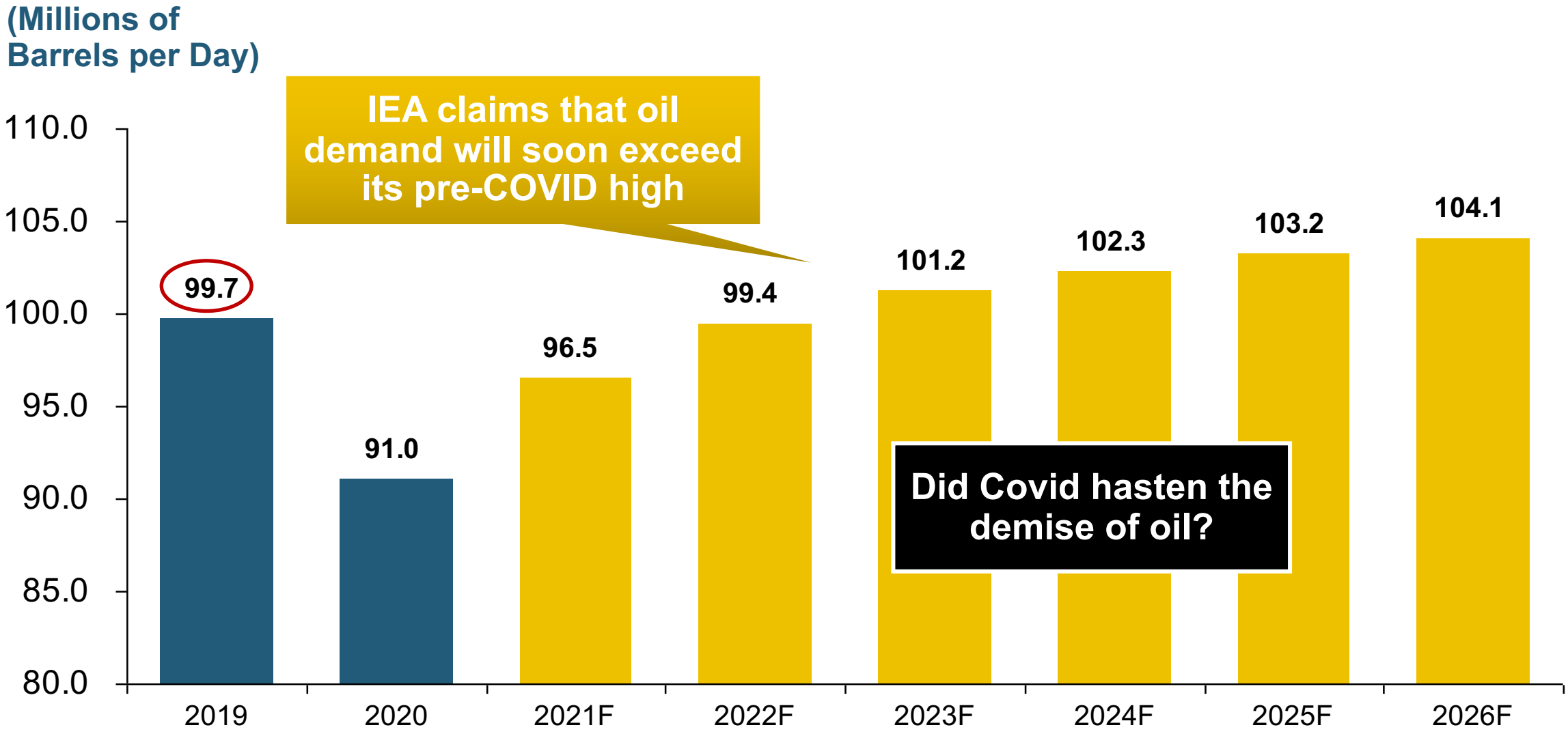
*Spot price as of 1 Nov. 2020.
Source: MarketWatch. Accessed 1 Nov. 2021 at: https://www.marketwatch.com/investing/future/brn00?countrycode=uk; USC Risk and Uncertainty Management Center.

Global Price of Coal, Australia: Jan. 2020 – Sept. 2021



Source: IMF.

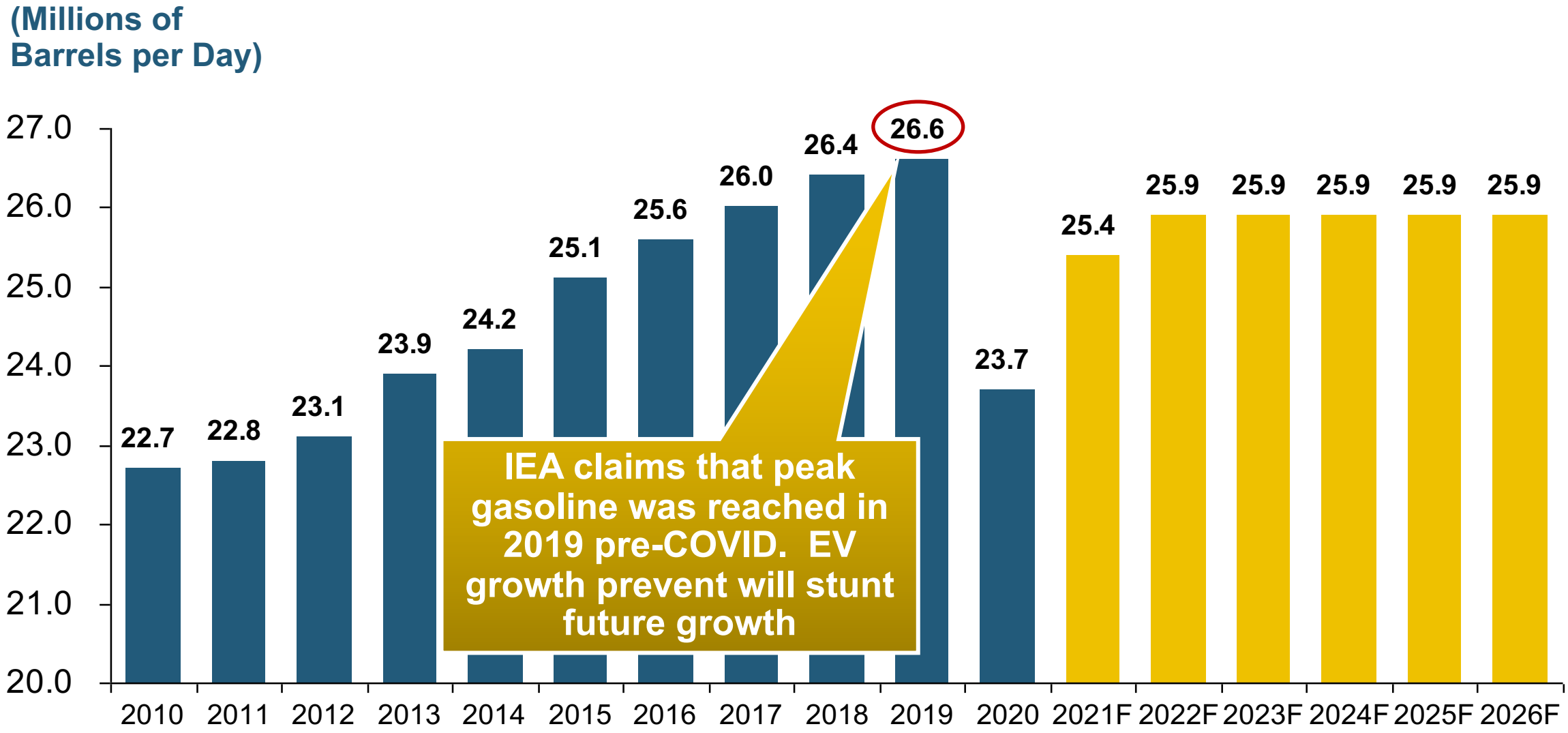
Global Oil Demand: No Peak in Sight, 2019 – 2026F



Source: International Energy Agency, *Oil 2021* (March 2021) at: https://www.iea.org/reports/oil-2021#executive-summary

28

Global Gasoline Demand: Past Peak? 2010 – 2026F



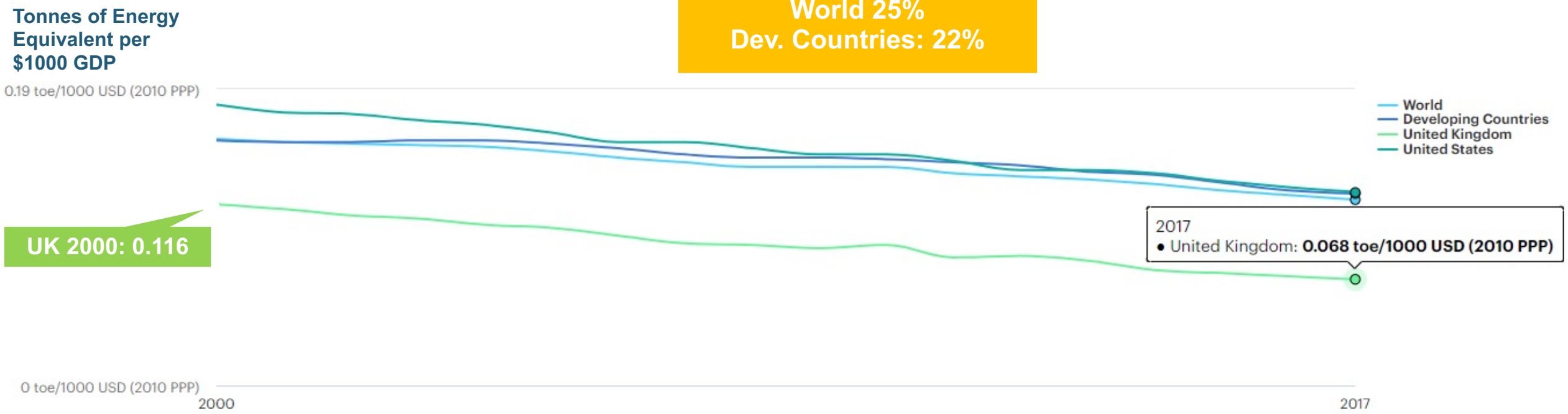
Source: International Energy Agency, *Oil 2021* (March 2021) at: https://www.iea.org/reports/oil-2021#executive-summary

29

Energy Intensity Measured in Terms of Primary Energy and GDP, 2000 – 2017*

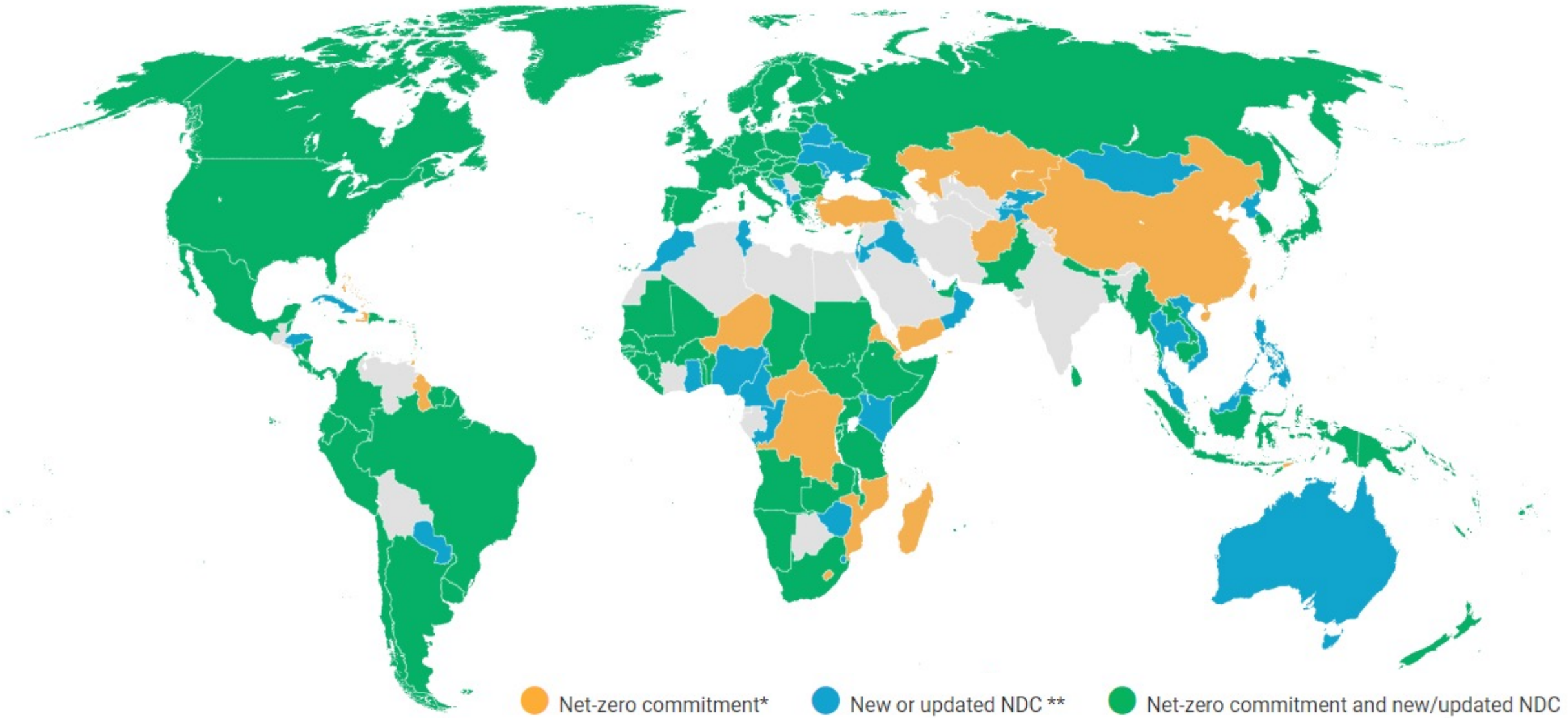
Energy Intensity Improvements 2000 – 2017

UK: 41%
US 31%
World 25%
Dev. Countries: 22%



Source: International Energy Agency, *Energy Intensity*. Available at: https://www.iea.org/reports/sdg7-data-and-projections/energy-intensity

Type of Net Zero Commitment by Country (as of Oct. 2021)



Source: United Nations. Accessed 1 Nov. 2021 at: https://www.un.org/en/climatechange/net-zero-coalition

**NDC = Nationally Determined Contribution is an action plan called for by the 2015 Paris Agreement.

Average Annual Upstream Oil and Gas Investment, by Scenario

Stated Policy
Requires $1.37 trillion in new Oil and Gas Investment through 2050

Announced Pledges
Requires $1.03 trillion in new Oil and Gas investment through 2050

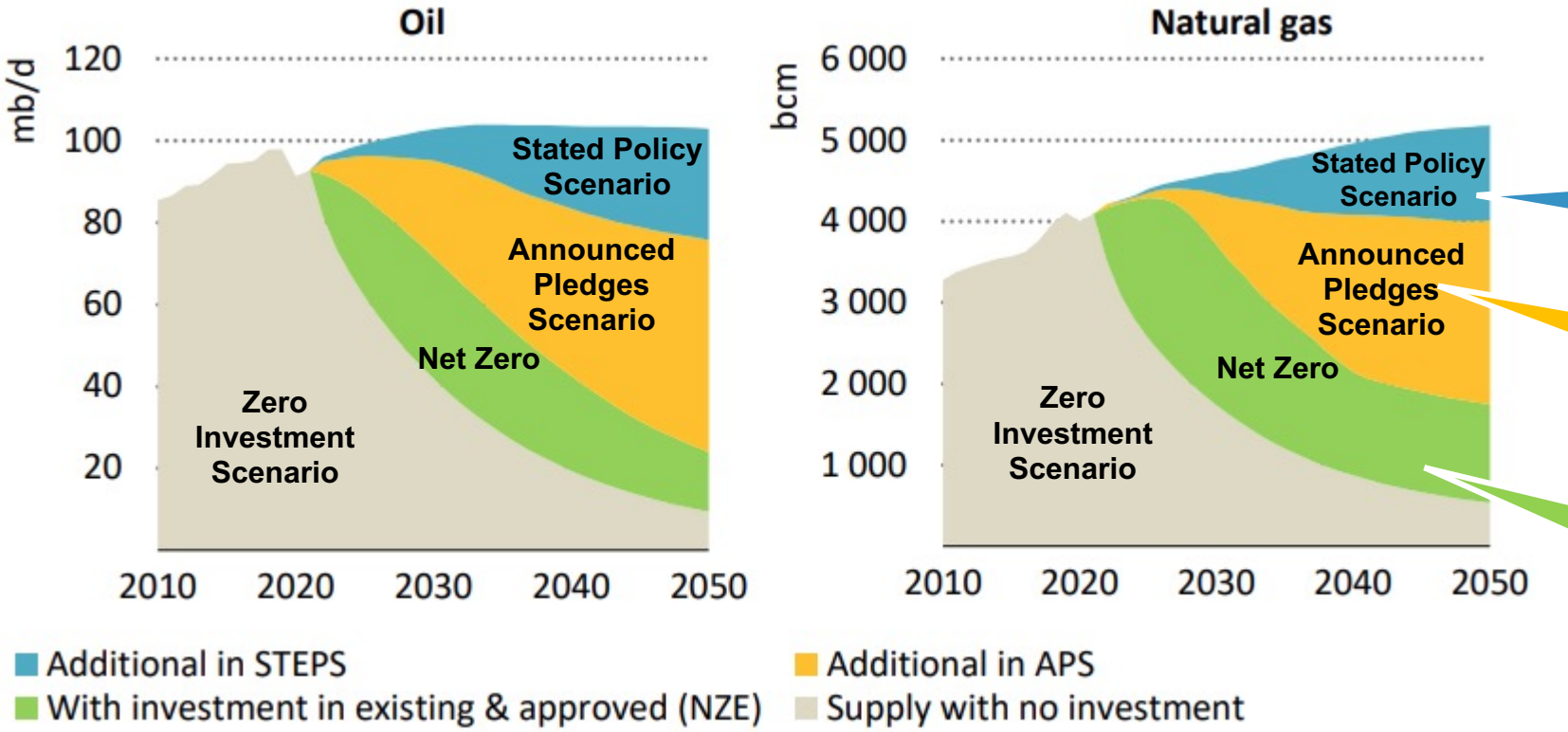
Net Zero
Requires $646B in new Oil & Gas investment through 2050

USD billion (2020)		STEPS		APS		NZE	
	2020	2021-2030	2031-2050	2021-2030	2031-2050	2021-2030	2031-2050
Existing fields		244	255	240	204	288	171
New fields		403	436	331	251	77	0
Total	**330**	**647**	**691**	**572**	**455**	**365**	**171**

Note: New fields also include those that have already been approved.

Source: International Energy Agency, *World Energy Outlook 2021,* (Table 6.1).

Global Oil and Natural Gas Demand and Declines in Supply by Scenario, 2010 – 2050F



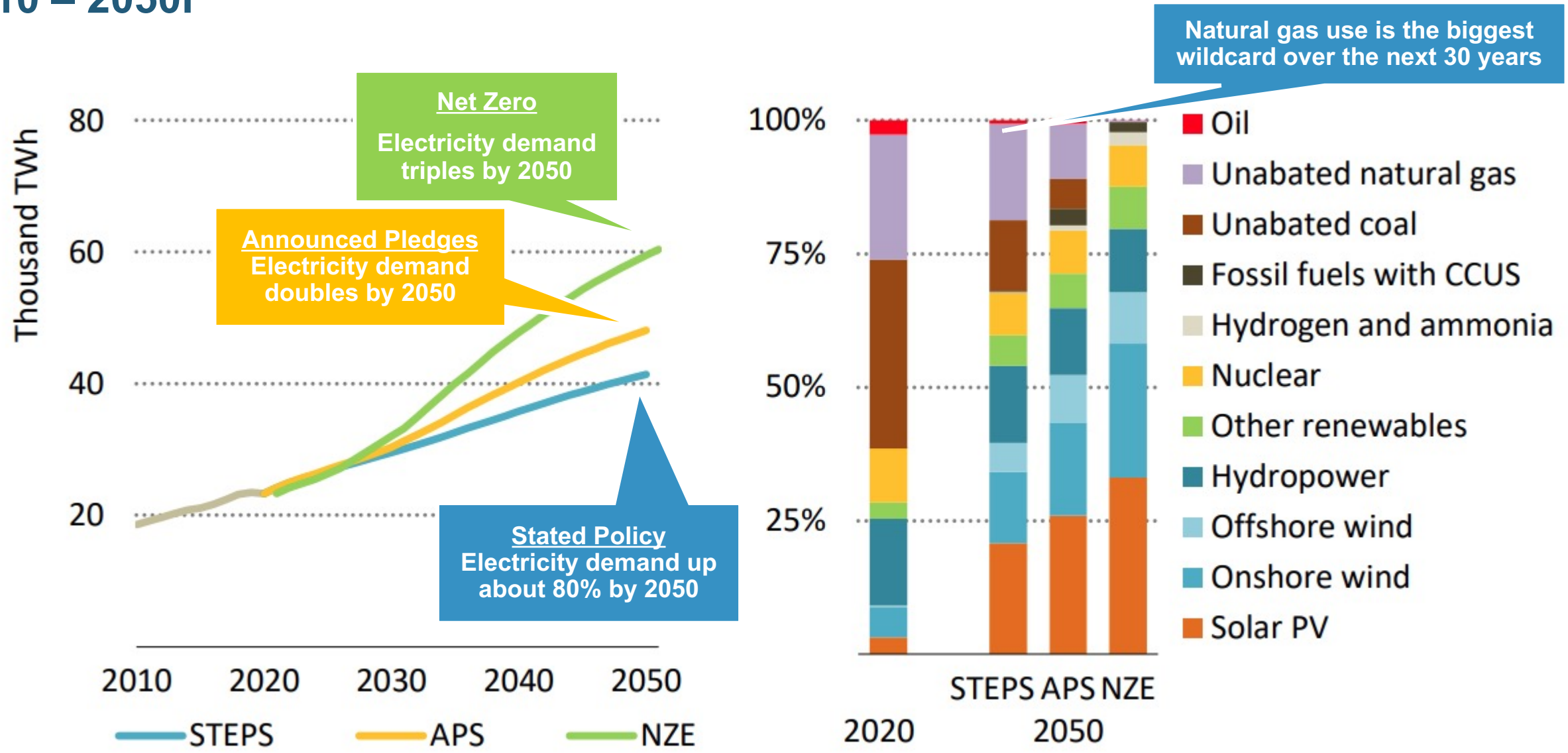
Stated Policy
Oil up by small amount, NG up substantially

Announced Pledges
Oil supply falls modestly, NG is flat

Net Zero
Global Oil & Gas supply decline 75% - 80%

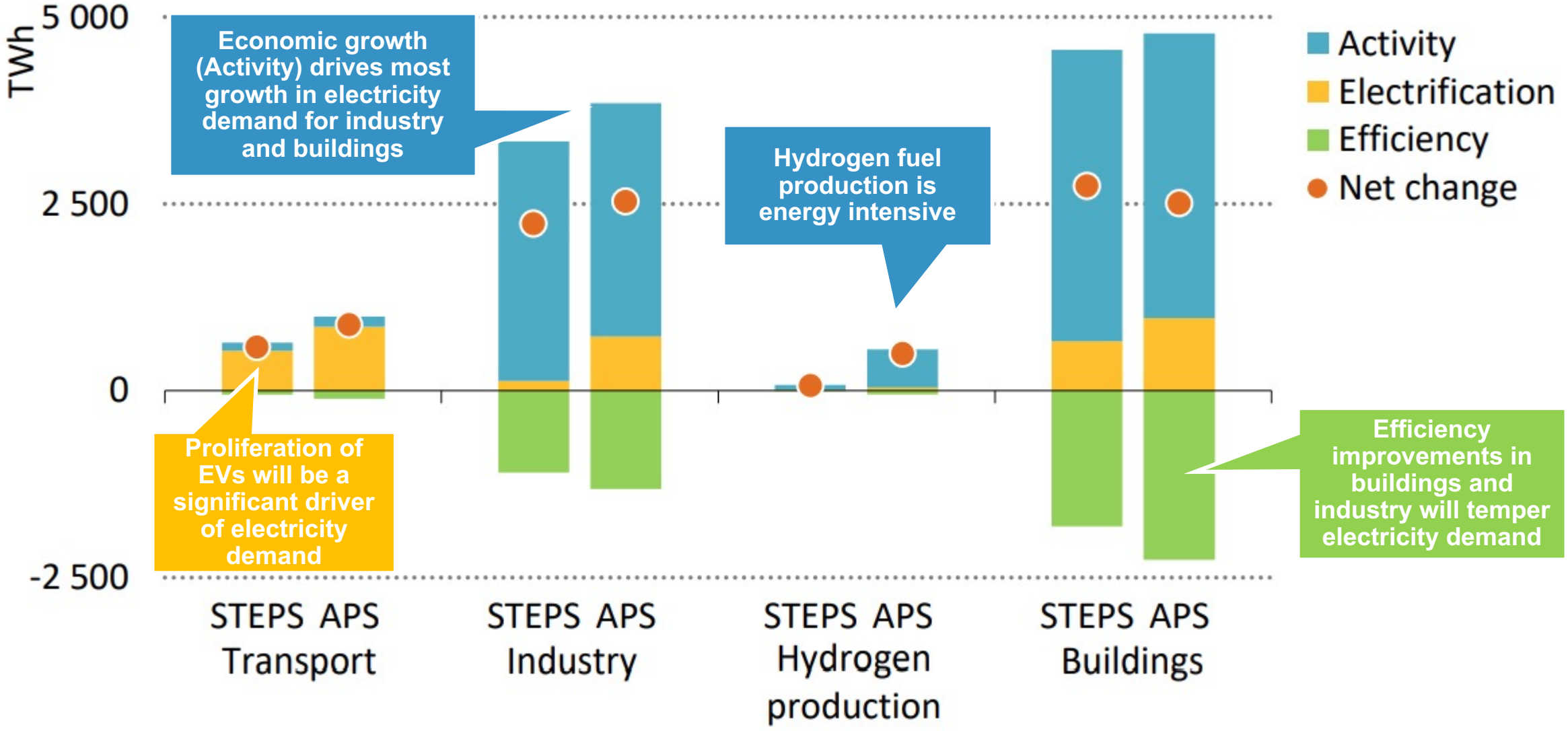
Source: International Energy Agency, *World Energy Outlook 2021,* (Fig. 6.18).

Global Electricity Demand and Generation Mix by Scenario, 2010 – 2050F



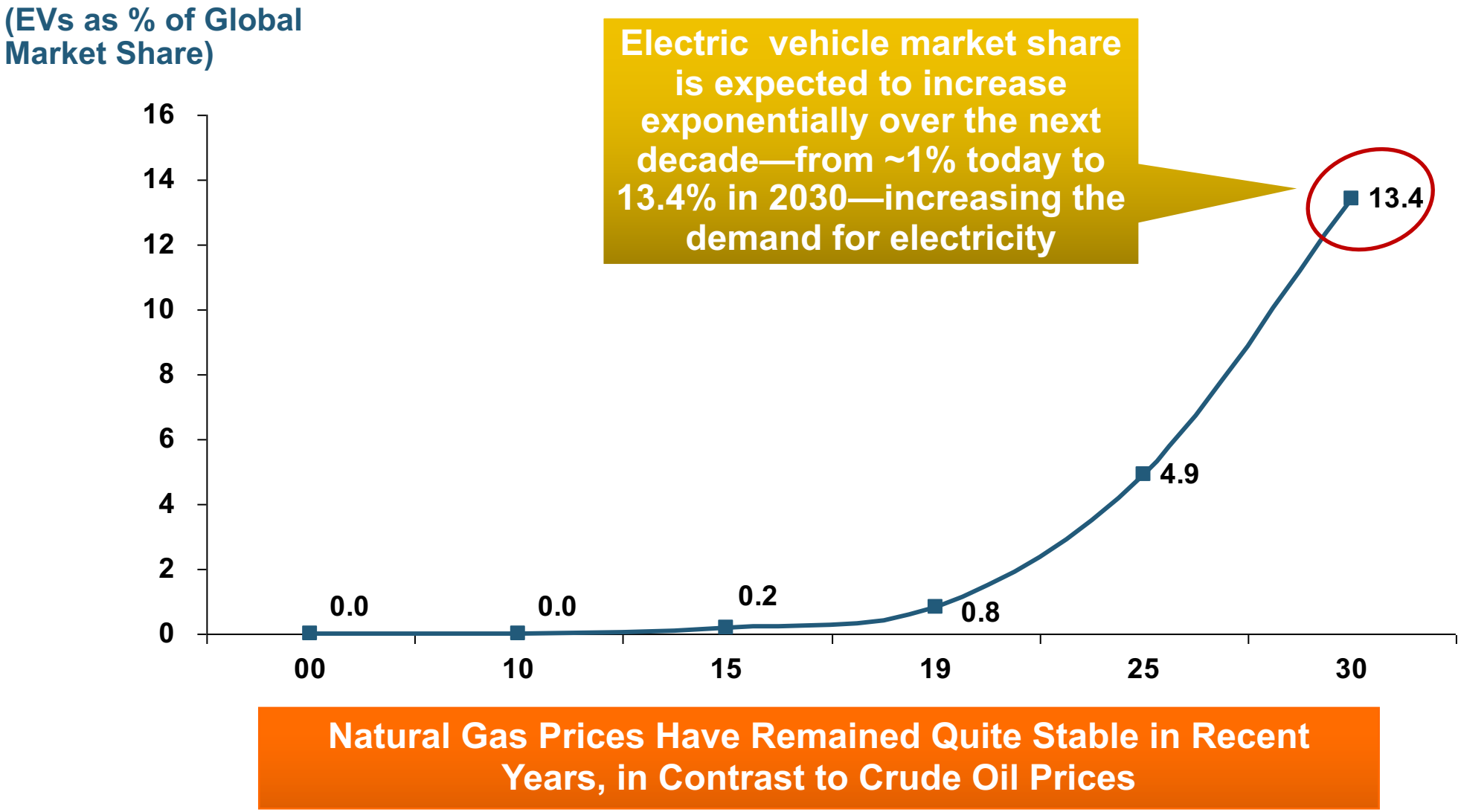
Source: International Energy Agency, *World Energy Outlook 2021,* (Fig. 4.20).

Drivers of Change in Global Electricity Demand in Stated Policies and Announced Pledges Scenarios, 2020 – 2030F



Source: International Energy Agency, *World Energy Outlook 2021,* (Fig. 4.21).

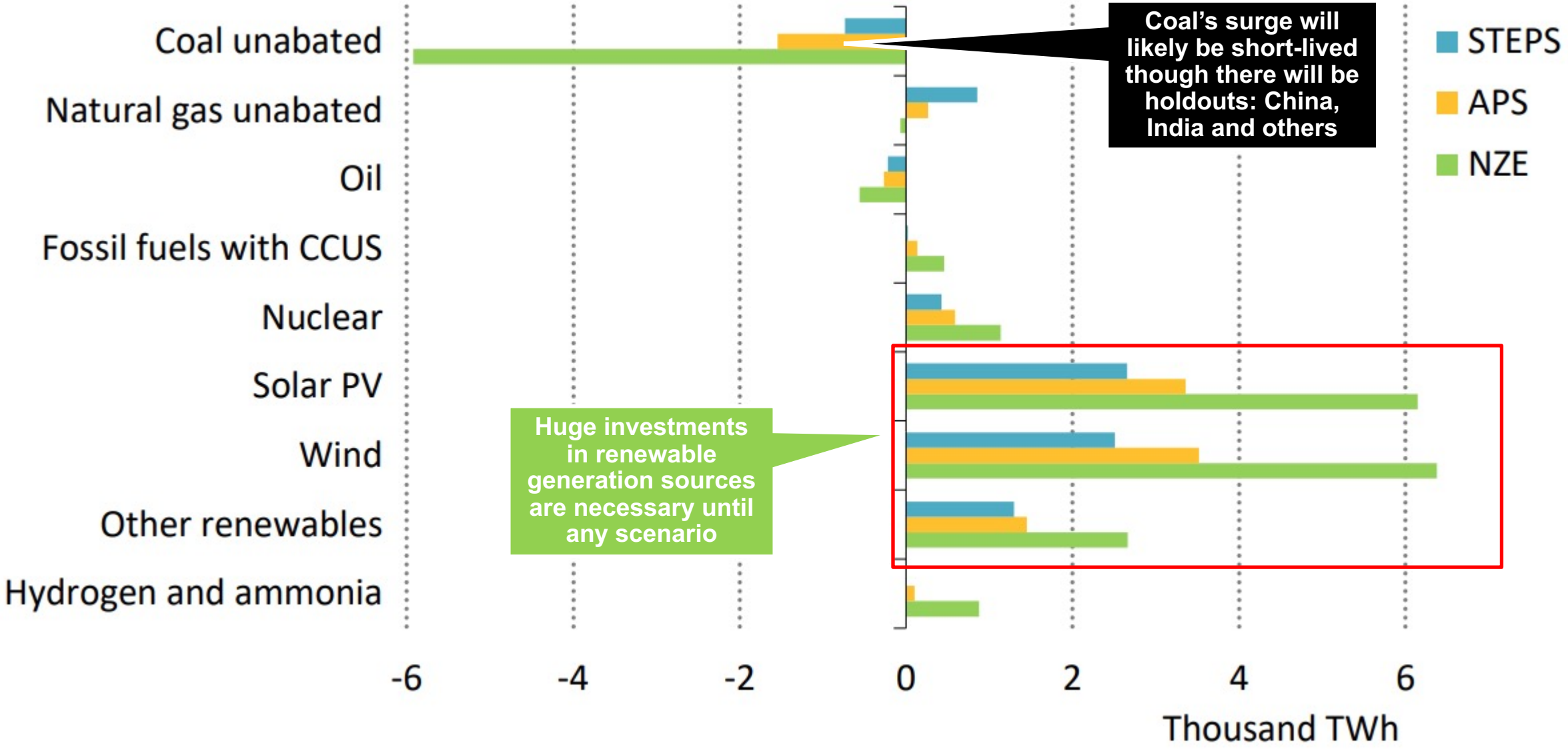
Global Electric Vehicle Market Share: 2000 – 2030F



Natural Gas Prices Have Remained Quite Stable in Recent Years, in Contrast to Crude Oil Prices

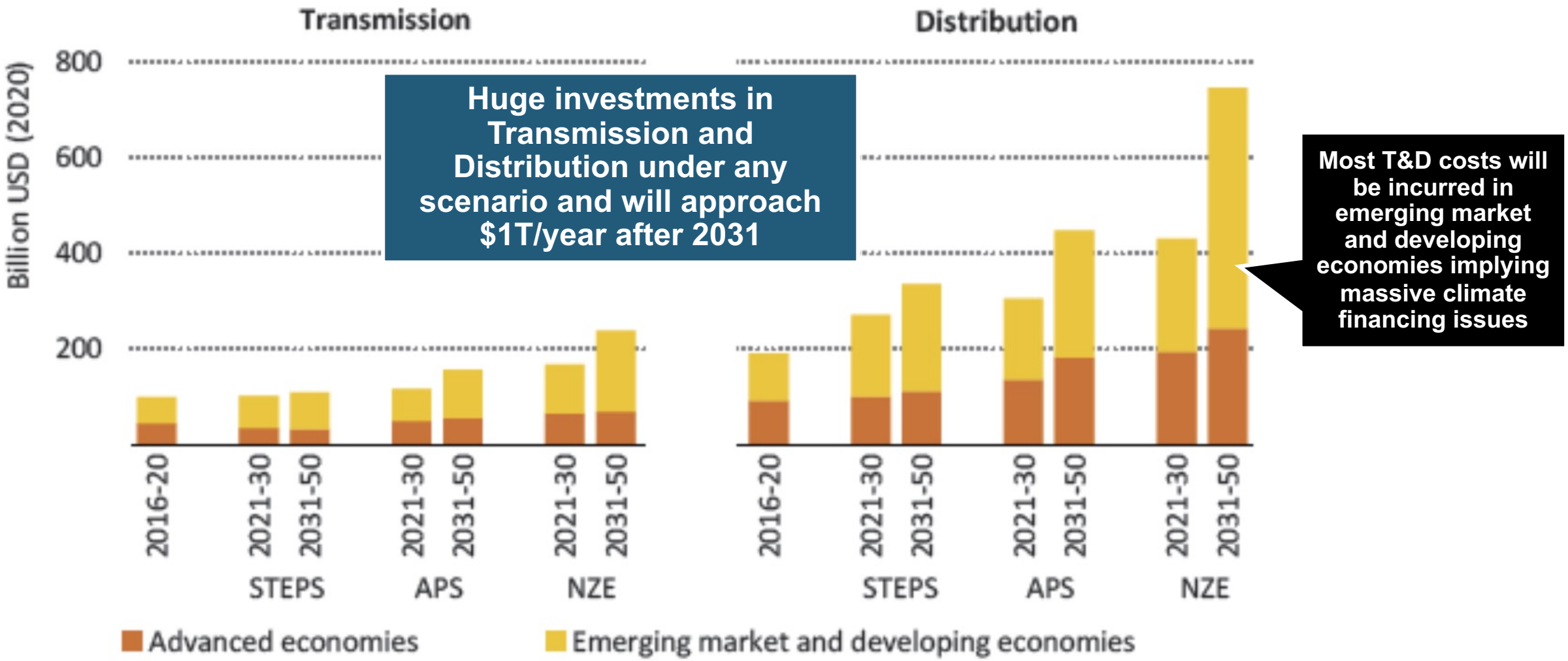
Source: IEA accessed 23 March 2021 at: https://www.iea.org/fuels-and-technologies/electric-vehicles

Change in Global Electricity Generation by Source and Scenario, 2020 to 2030F



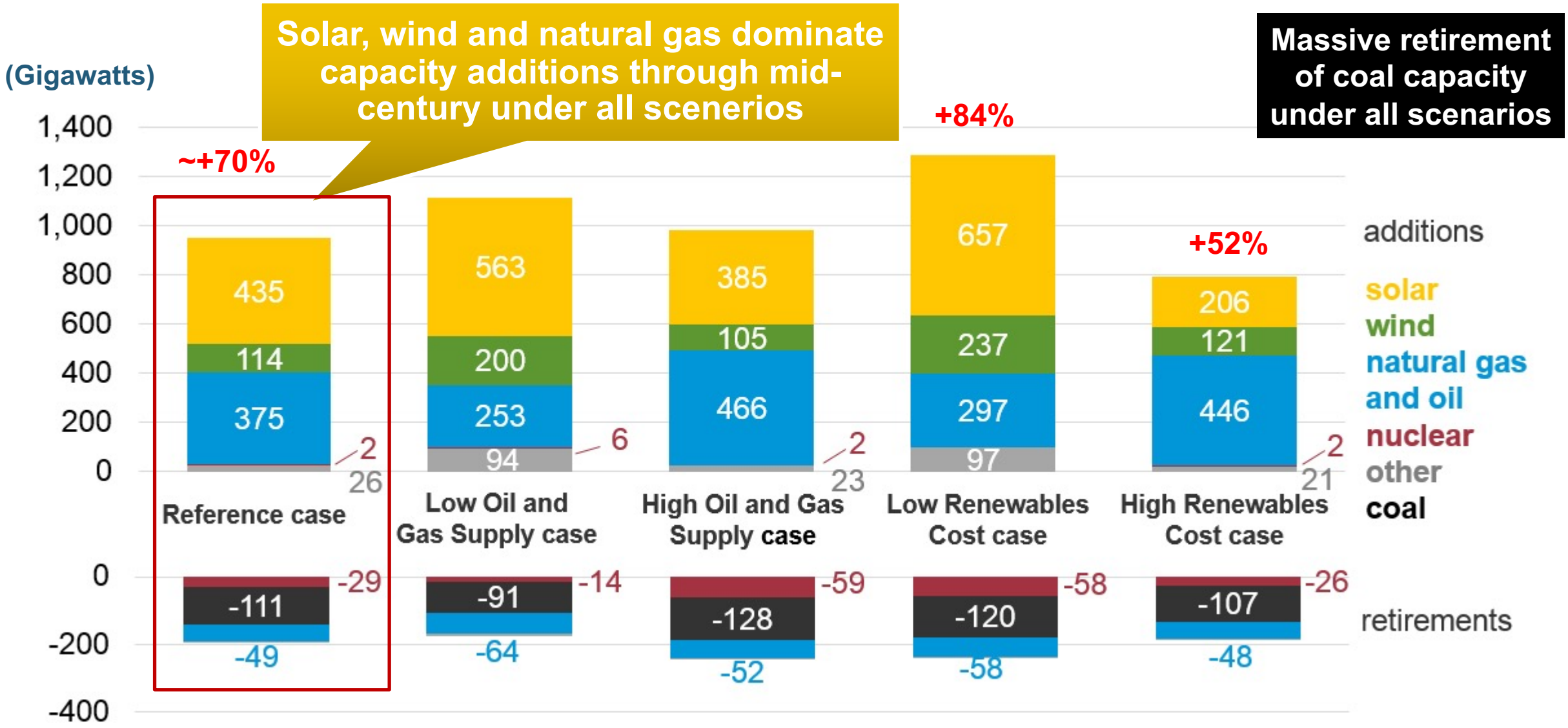
Source: International Energy Agency, *World Energy Outlook 2021,* (Fig. 4.23).

Change in Global Electricity Generation by Source and Scenario, 2020 to 2030F



Source: International Energy Agency, *World Energy Outlook 2021,* (Fig. 4.30).

U.S. Electricity Generating Capacity: Additions/Retirements by Fuel Source, 2021 – 2050

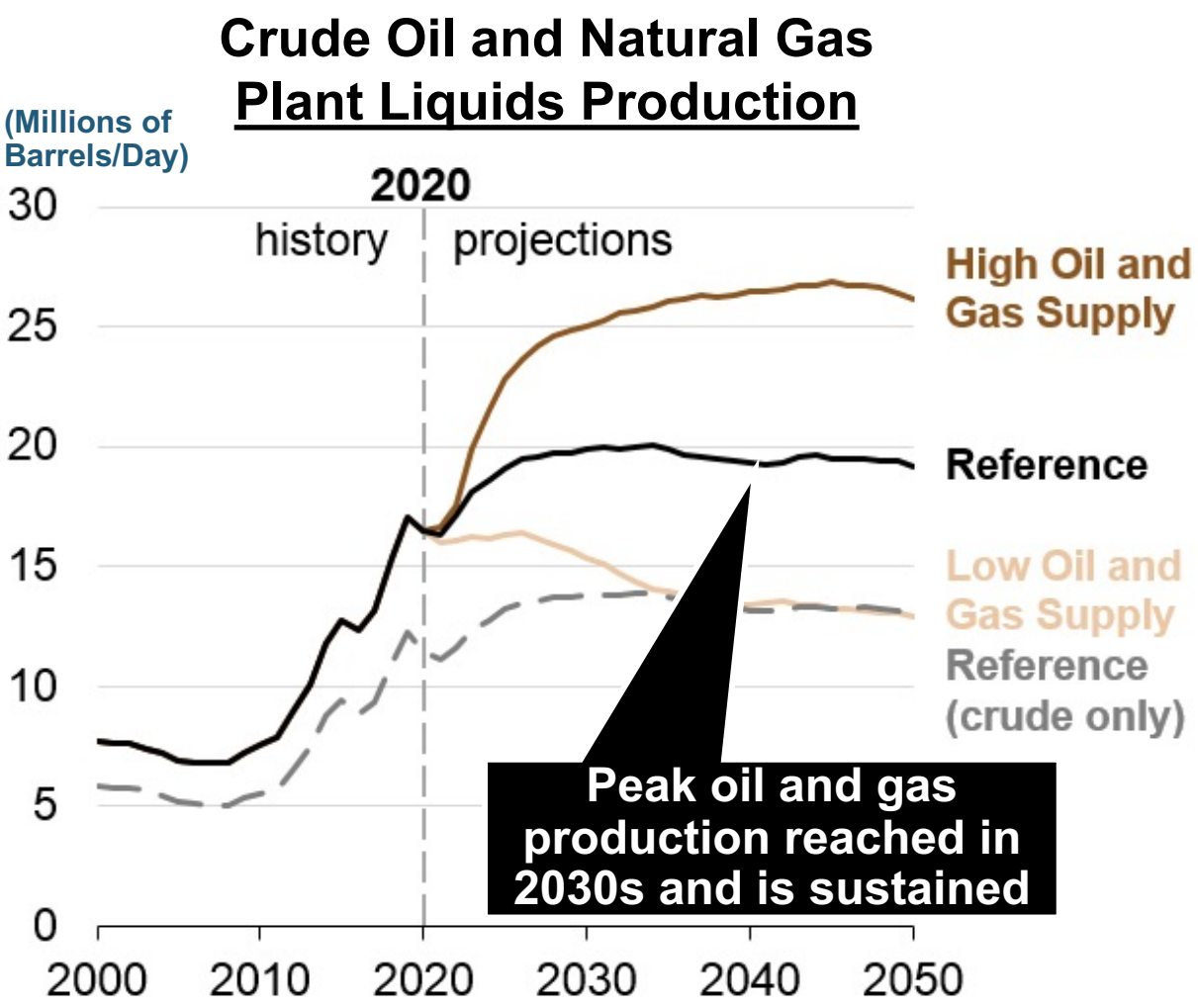


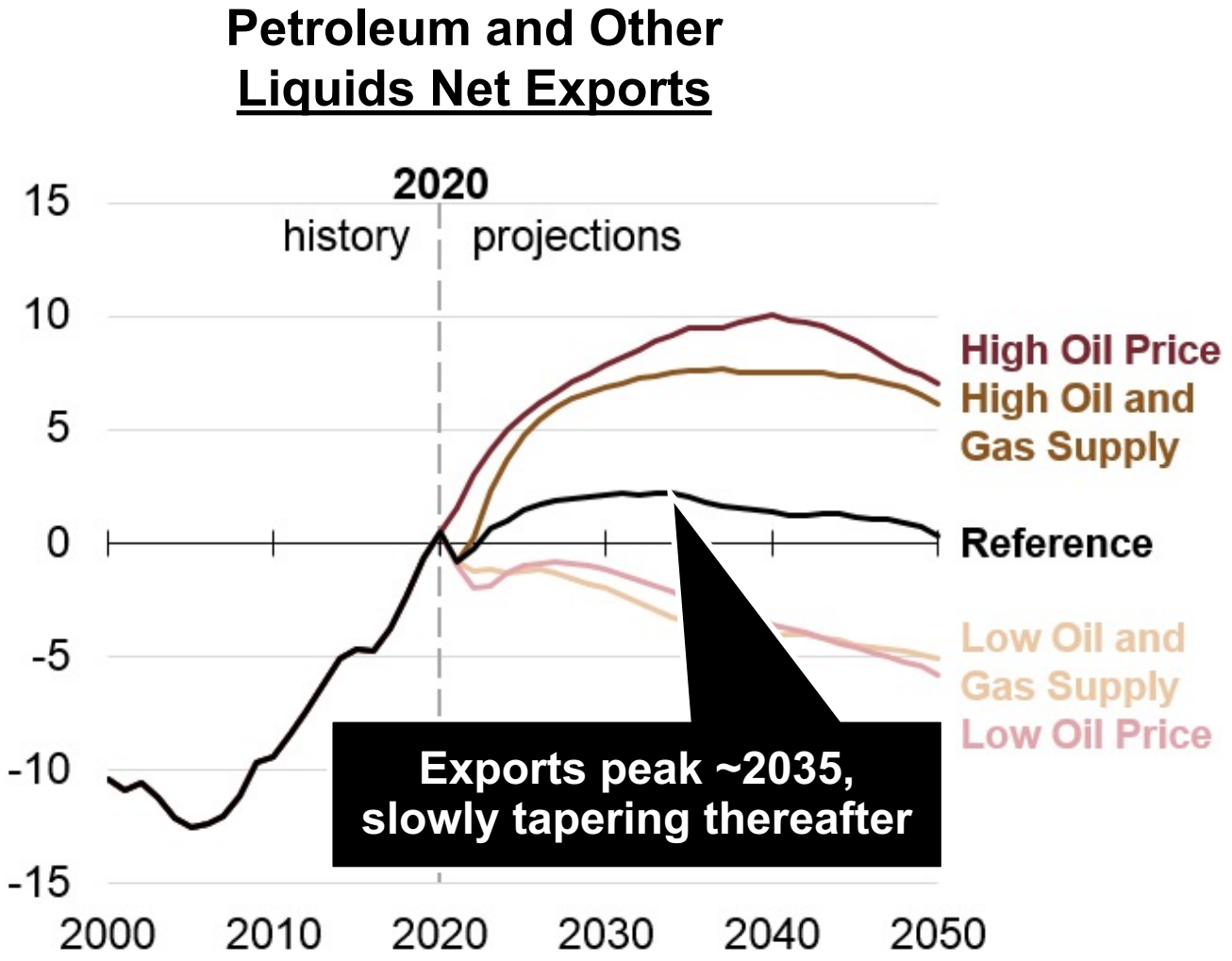
Source: Energy Information Administration, Annual Energy Outlook 2021 at: https://www.eia.gov/outlooks/aeo/

Estimated Present Value of Future Oil and Gas Production by Scenario through 2030

Source: International Energy Agency, World Energy Outlook 2020, accessed 3/23/21 at: https://www.iea.org/reports/world-energy-outlook-2020 ; University of South Carolina Risk Management and Uncertainty Center.

U.S. Crude Oil and Natural Gas Outlook: Production and Exports, 2000 – 2050





Source: Energy Information Administration, Annual Energy Outlook 2021 at: https://www.eia.gov/outlooks/aeo/

Summary

- **Covid, Supply Chain Disruptions, Inflation (including energy price inflation) have Introduced Significant Uncertainty into Economic and Energy Market Forecasts…*and therefore Energy Insurance Markets as Well***

- **The Long-Run Growth Outlook for the Global Energy Sector is Favorable with Pivot toward Renewables**

- **Suggests that (Re)Insurers Will Benefit as the Property and Casualty Exposures Base Expands Under Almost Any Transition Scenario**

- **Geopolitical Risks Remain Elevated**

UNIVERSITY OF
SOUTH CAROLINA
Darla Moore School of Business

Thank you for your time and your attention!

Twitter: twitter.com/bob_hartwig

For a copy of this presentation, email me at robert.hartwig@moore.sc.edu