# Global Energy Outlooks

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**KOGA Annual Meeting (June 2024)**

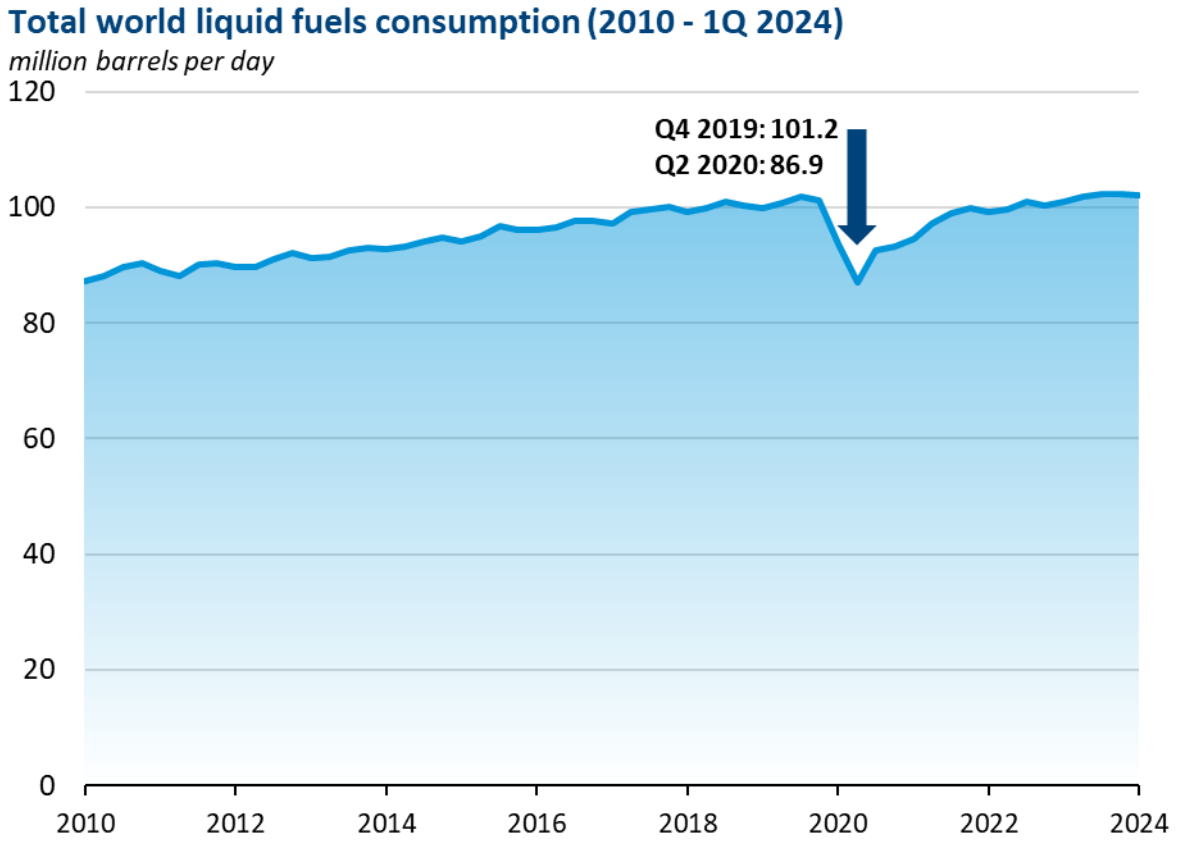
American Petroleum Institute

# COVID-19 further illustrated that energy consumption is intrinsic to everyday life

- At least 3 million COVID-19 deaths in 2020
- Nearly 90% of world economy under some form of lockdown
- 34.3 million people fell below extreme poverty line
- Global GDP fell -3.1%
- Estimated economic losses of $4.7 trillion

- **The world <u>still consumed</u> 86.9 million barrels per day of liquid fuels in Q2 of 2020.**

Source: World Health Organization; United Nations; World Bank.

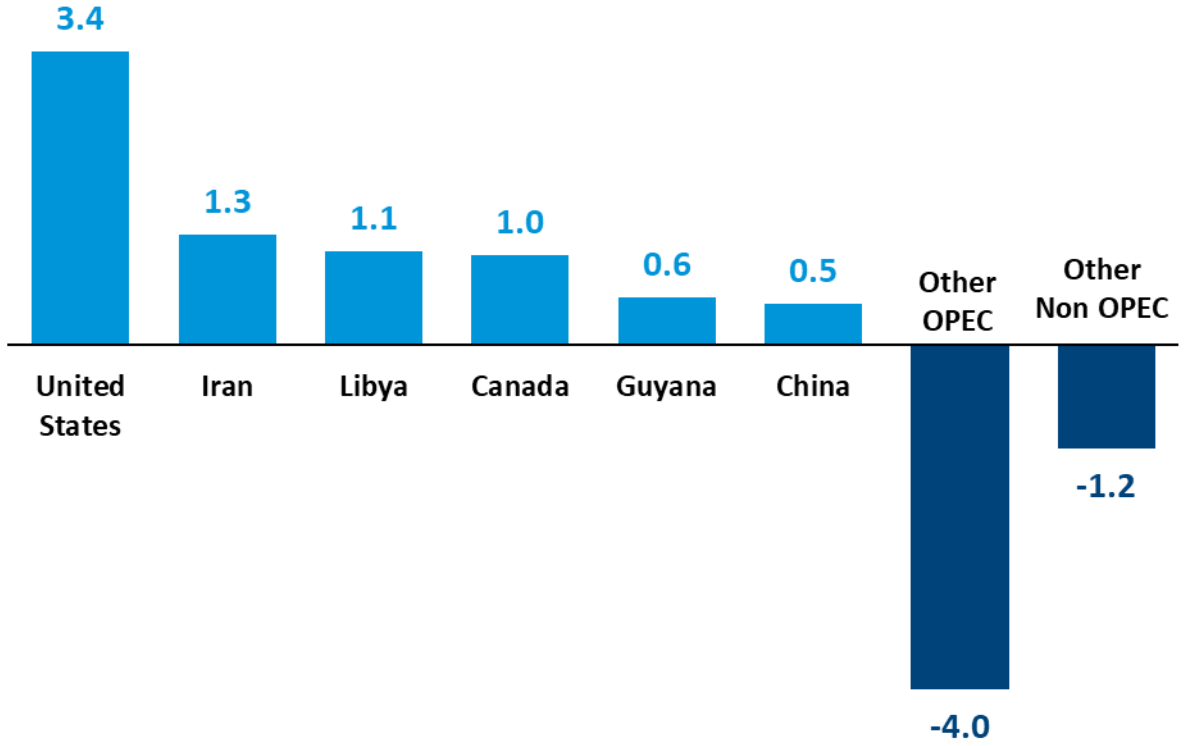



Note: Quarterly data
Source: U.S. Energy Information Administration, World Health Organization, United Nations, World Bank

# Since the pandemic, the U.S. is the global leader in petroleum and natural gas supply growth

## The United States is the largest source of post-covid petroleum supply growth

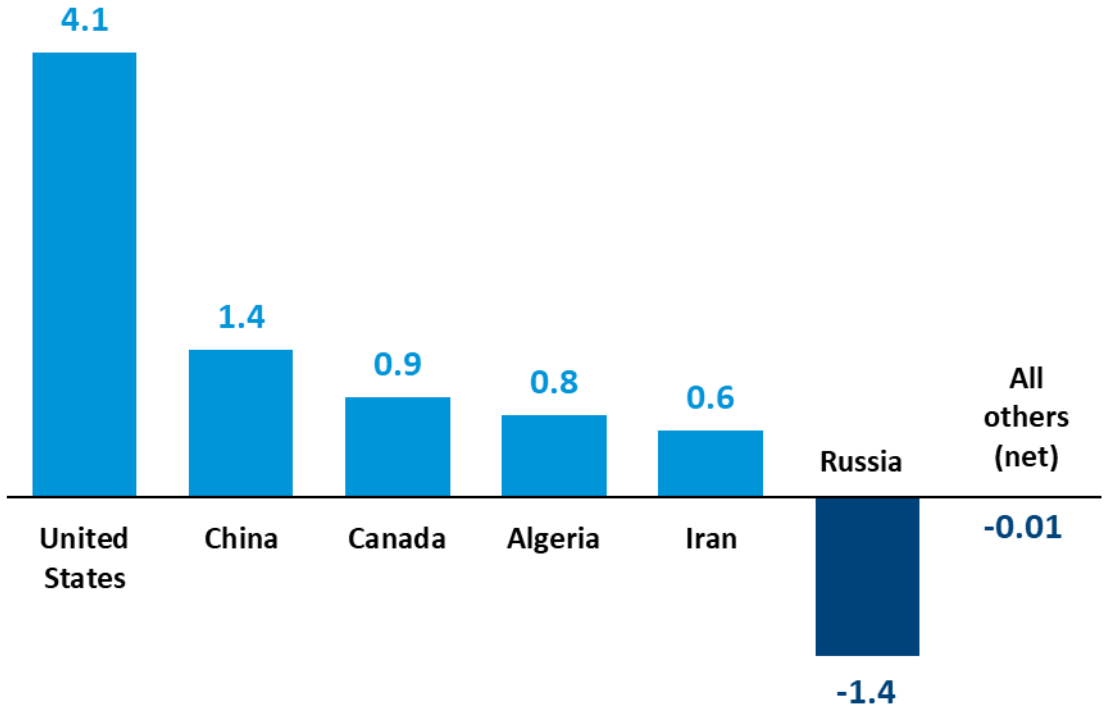
Petroleum liquids production growth since April 2020 *(million barrels per day)*




Notes: Total petroleum liquids include crude oil, natural gas plant liquids, biofuels, other liquids, and refinery processing gains.
Source: Energy Information Administration.

## The United States is the largest source of post-covid natural gas supply growth

Dry gas production growth 2020 to 2023 (*Tcf per year*)

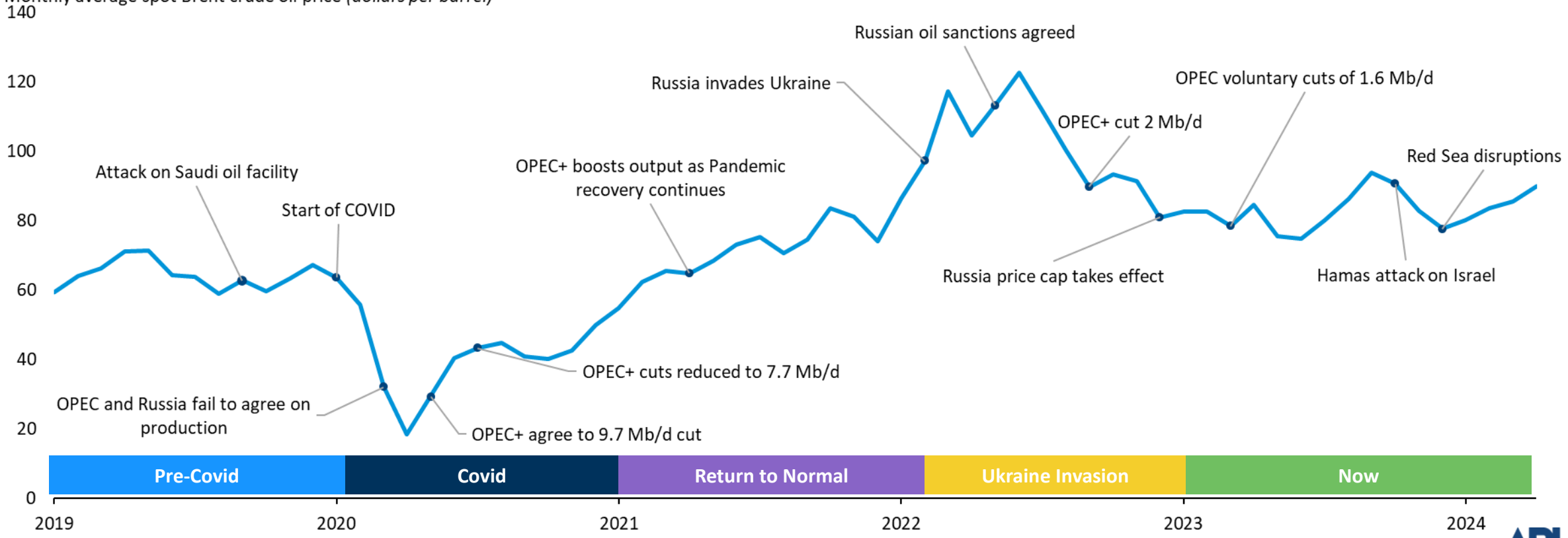



Source: Energy Information Administration, Gas Exporting Countries Forum

# The last 5-years have been tumultuous; imagine where we would be without new supplies from the United States?

## Global oil prices and major market events show how eventful the past 5 years have been

Monthly average spot Brent crude oil price *(dollars per barrel)*




Source: Energy Information Administration

# There are many competing narratives about the long-term future of energy, particularly the role of fossil fuels.


Video Ad Feedback

## IEA predicts fossil fuel demand to peak by 2030

Despite record growth in clean energy capacity -- the International Energy Agency says fossil fuel demand will peak by 2030, but not fast enough.

01:54 - Source: CNN

SUSTAINABLE FUTURE

## Peak fossil fuel demand is coming, IEA chief Birol says — and China will be key

PUBLISHED FRI, OCT 27 2023•1:11 AM EDT | UPDATED FRI, OCT 27 2023•2:18 AM EDT

Anmar Frangoul

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Energy | OPEC

## OPEC sees no peak oil demand long term, secretary general says

By Reuters

June 14, 2024 1:15 AM EDT · Updated 10 days ago

ENERGY TRANSITION | NATURAL GAS | OIL — 09 Oct 2023 | 08:01 UTC

## OPEC sees no peak oil demand on horizon, more crude needed to fuel global economy

HIGHLIGHTS

- Long-term demand forecast raised by 6 mil b/d
- Global oil demand to keep rising through at least 2045
- Sec gen says calls to end drilling could cause 'chaos'

ENERGY

## 'Extremely risky': OPEC criticizes IEA forecast that fossil fuel demand will peak before 2030

PUBLISHED THU, SEP 14 2023•8:41 AM EDT

Sam Meredith
@IN/SAMUELMEREDITH
@SMEREDITH19

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The Washington Post
Democracy Dies in Darkness

## What the world would look like without fossil fuels

A thought experiment shows the complexities of phasing out oil, gas and coal

Analysis by Shannon Osaka
Climate zeitgeist reporter

September 30, 2023 at 7:00 a.m. EDT

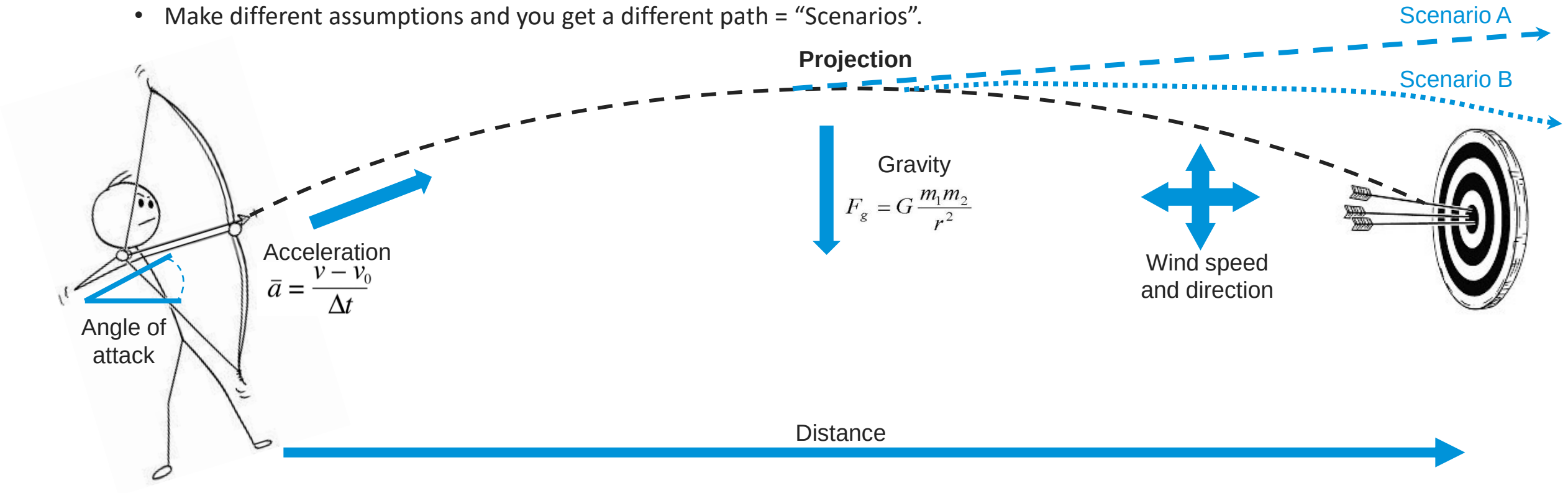
JPMorgan Chase & Co + Add to myFT

## JPMorgan warns of need for 'reality check' on phasing out fossil fuels

US bank says higher interest rates, inflation and global conflict have dented outlook for energy transition

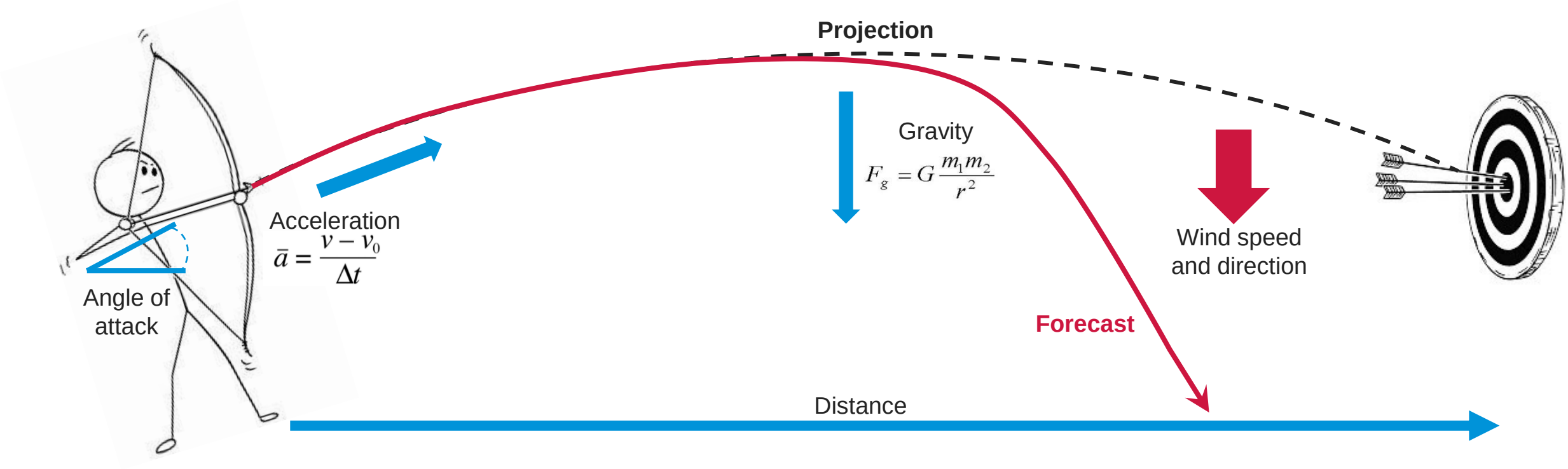
# Energy Outlooks: A user's guide

- An energy outlook is a “projection”, which is different from a “forecast”.
- A projection is like an archer launching an arrow.
  - Using assumptions about the basic physics, we can make a “projected path” of the arrow’s flight.
  - Make different assumptions and you get a different path = “Scenarios”.



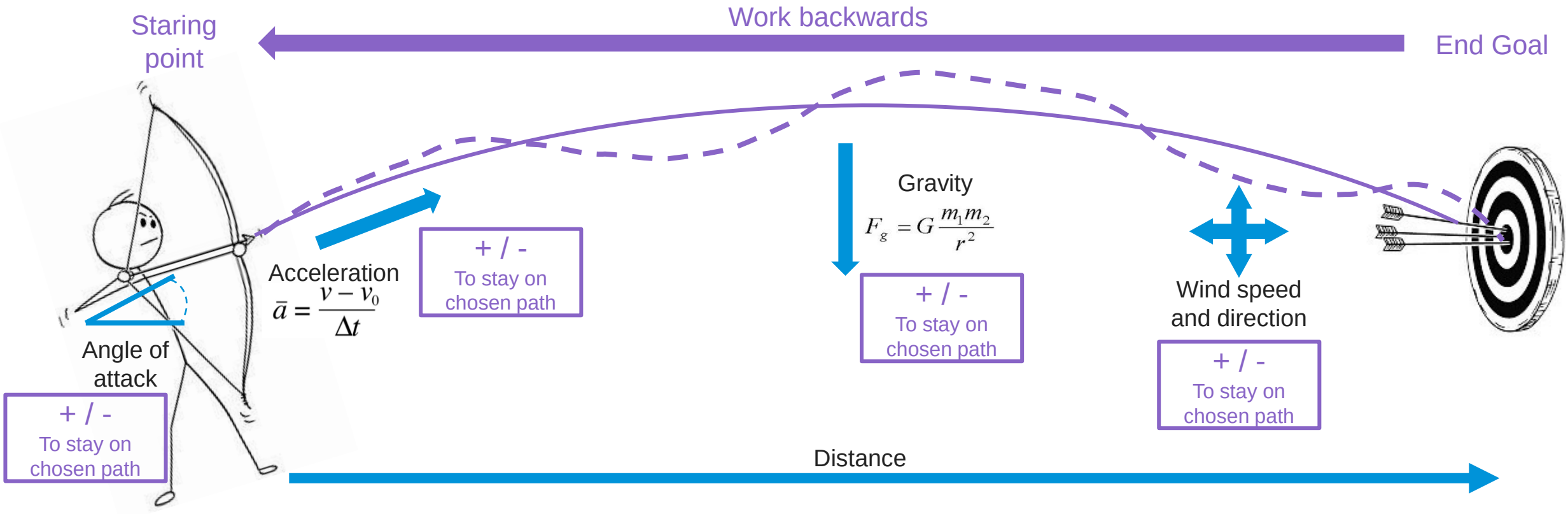
# Energy Outlooks: A user's guide

- A forecast makes predictions about how, when, and by how much, the variables will change.
  - i.e. a gust of wind in a particular direction at a particular time of the arrow's flight.



# Energy Outlooks: A user's guide

- A normative scenario, starts with a chosen end goal and works backwards to determine what must happen for that goal to be achieved.
  - i.e. IEA's "Net-zero by 2050 scenario"



# Energy Outlooks: Misused, Abused, and Misunderstood

**“I reject your reality and substitute my own”**

- It doesn’t agree with my views, therefore it is wrong.

**“They were wrong before”**

- History is no guarantee for future success.
- Models don’t project technological revolutions.

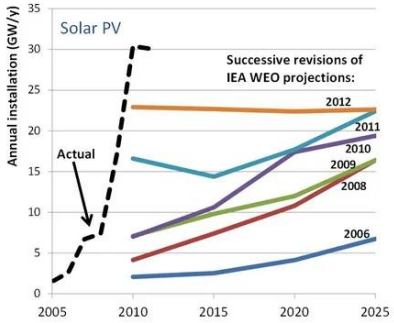
**“I have no idea what I’m doing”**

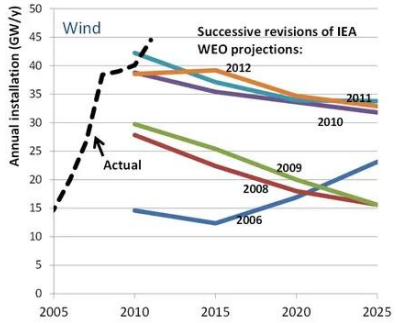
- Non-experts misinterpret and misrepresent results.
- Taking projections out of context makes for better headlines but skews the narrative.

The Guardian Thu 5 Apr 2018

IEA accused of undermining global shift from fossil fuels

Highly critical study warns projections used by the organisation tasked with leading the switch to clean energy remain skewed towards oil and gas and may break climate targets of Paris agreement




The New York Times October 24, 2023

*Energy Agency Sees Peaks in Global Oil, Coal and Gas Demand by 2030*

The prediction, which has stirred controversy among oil producers, is a sign of a sweeping transformation in the global energy landscape.

# Global events combined with policy, technology, and macroeconomic uncertainty makes this a difficult time to gain meaningful insights from energy outlooks.

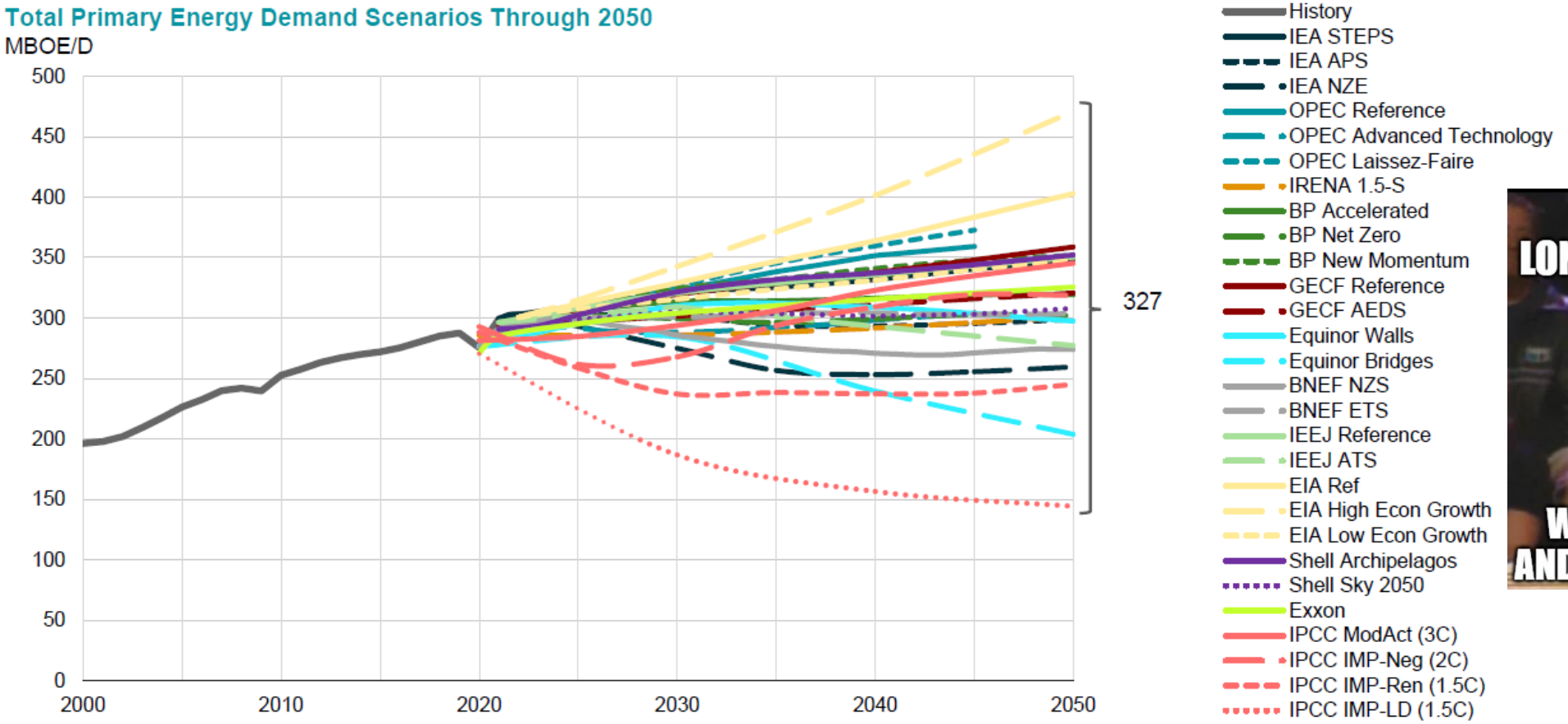
- **Global events:**
  - Pandemic and lingering changes
  - Russian invasion of Ukraine
  - Israel-Gaza war
  - Shifting global trade patterns
- **Policy uncertainty:**
  - The details of the IRA are still being sorted out
  - E.U. carbon boarder adjustment mechanism
  - U.S. – E.U. policy/regulation alignment
- **Technology uncertainty:**
  - Shifting EV battery chemistries
  - Improved versions of pre-existing tech
  - Multiple technologies in the same space but no clear favorite
- **Macroeconomic uncertainty:**
  - U.S. Federal Reserve – interest rates
  - China - ?

**2020-22:**
**“accelerate” the energy transition**

**2023:**
**“managing” the energy transition**

**2024:**
**“multidimensional” energy transition**

# Long-term scenarios: Whose line is it anyway?

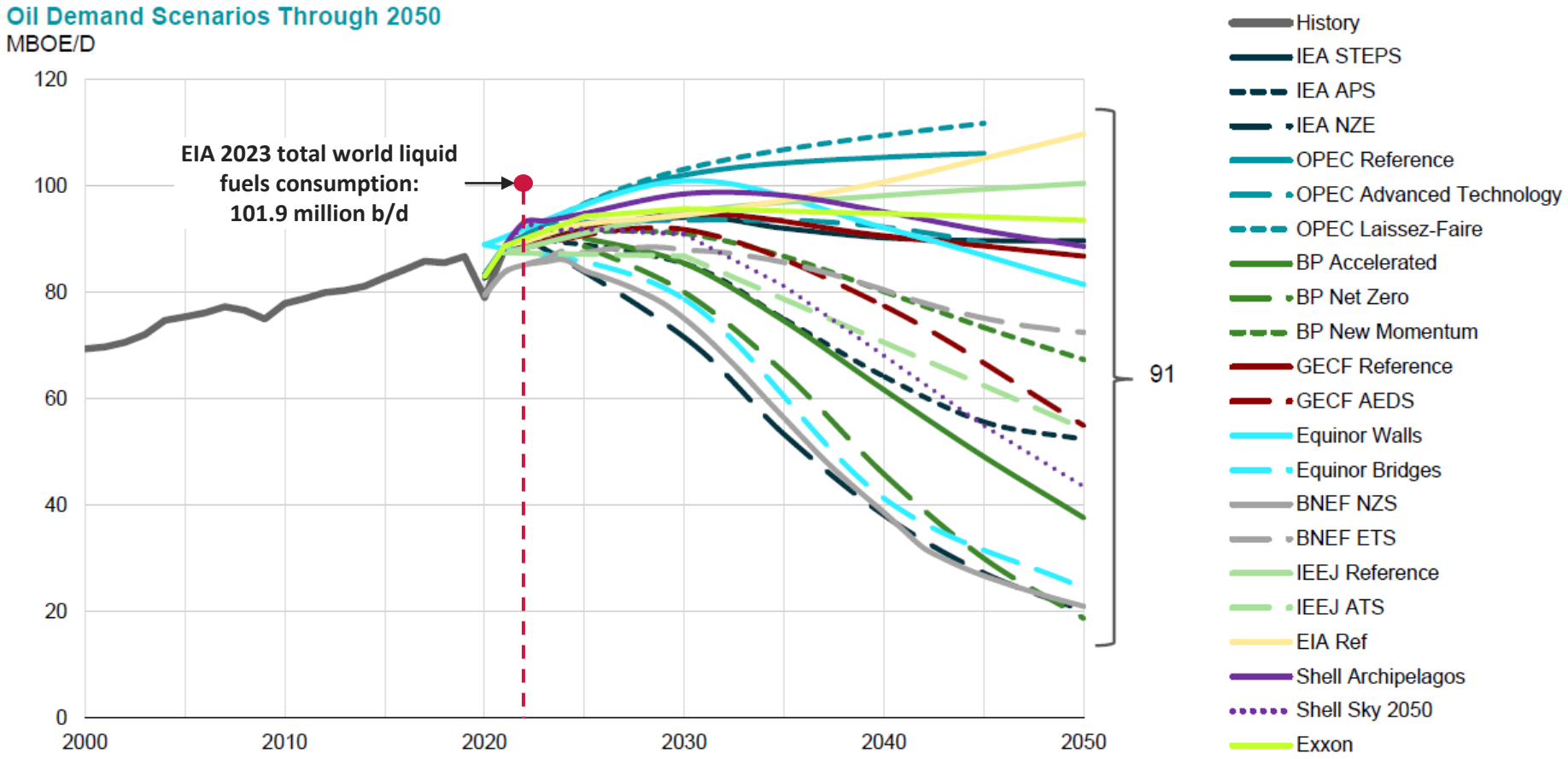




*Source: IEF, IEA WEO 2023, OPEC WOO 2023, IRENA World Energy Transitions Outlook 2023, BP Energy Outlook 2023, GECF 2023 Global Gas Outlook to 2050, Equinor Energy Perspectives 2023, BNEF New Energy Outlook 2024, IEEJ Outlook 2023, EIA IEO 2023, Shell Energy Security Scenarios, Exxon Global Outlook, IPCC AR6*

# Most scenarios show a peak or plateau in oil demand, but no consensus on the long-term.

**Note:** In this report from the IEF, "oil" is reported in the context of primary energy demand – it excludes biofuels, coal-to-liquids, and gas-to-liquids and is reported in energy equivalent units (mboe/d) to allow for a comparison between different fuel types.




*Oil excludes biofuels, coal-to-liquids, and gas-to-liquids (see appendix for more information).

*Source: IEF, IEA WEO 2023, OPEC WOO 2023, BP Energy Outlook 2023, GECF 2023 Global Gas Outlook to 2050, Equinor Energy Perspectives 2023, BNEF New Energy Outlook 2024, IEEJ Outlook 2023, EIA IEO 2023, Shell Energy Security Scenarios, Exxon Global Outlook*

# Long-term oil ambition and demand-reality gap

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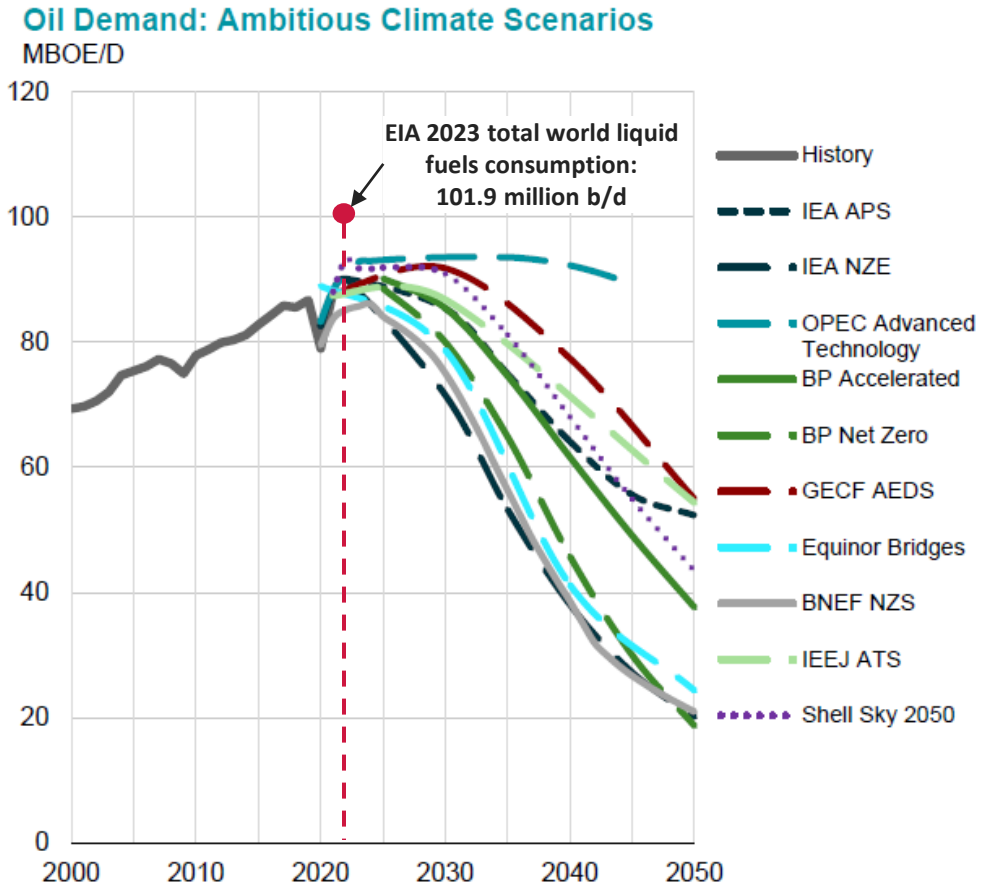


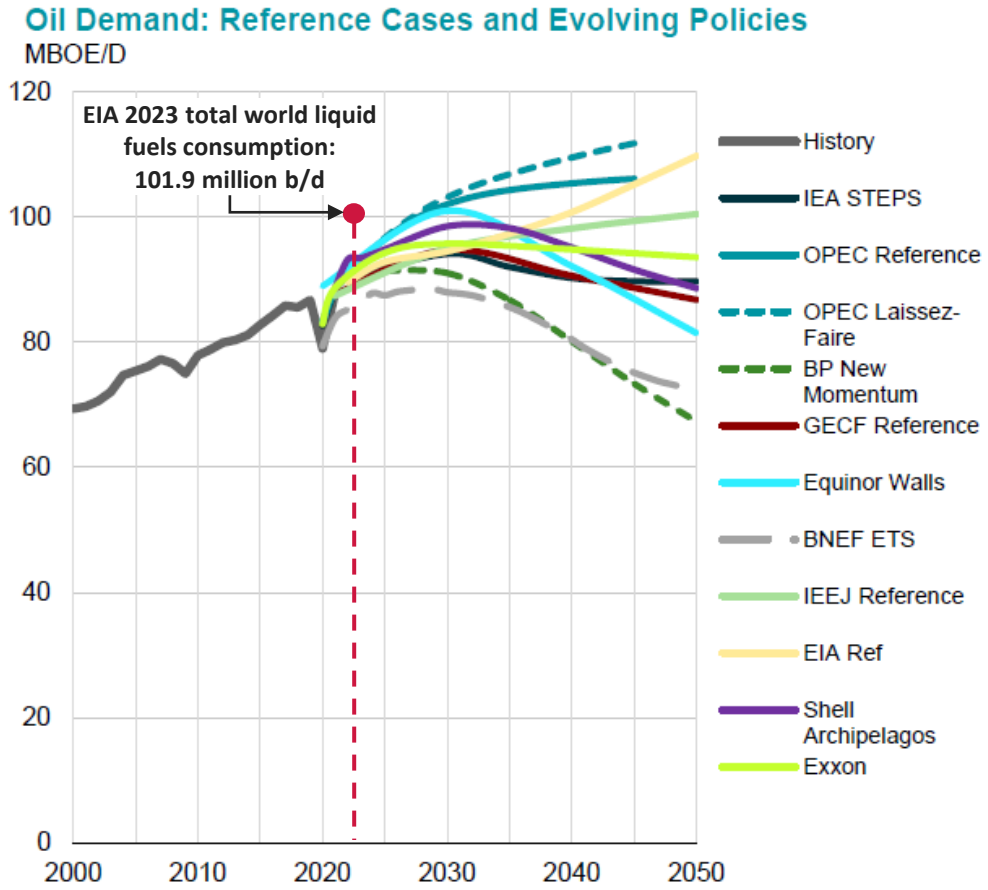


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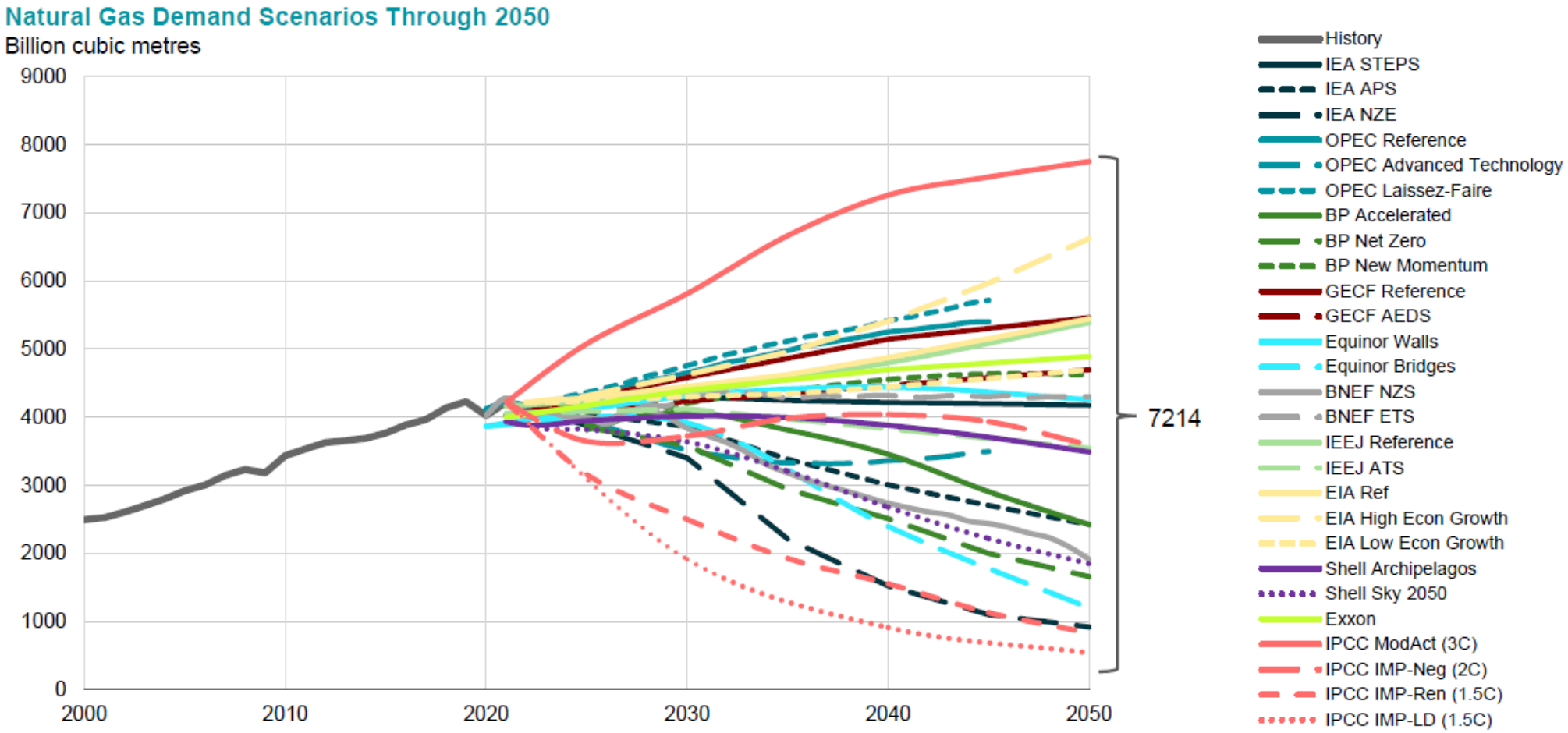
# There is even less consensus on long-term demand or natural gas.

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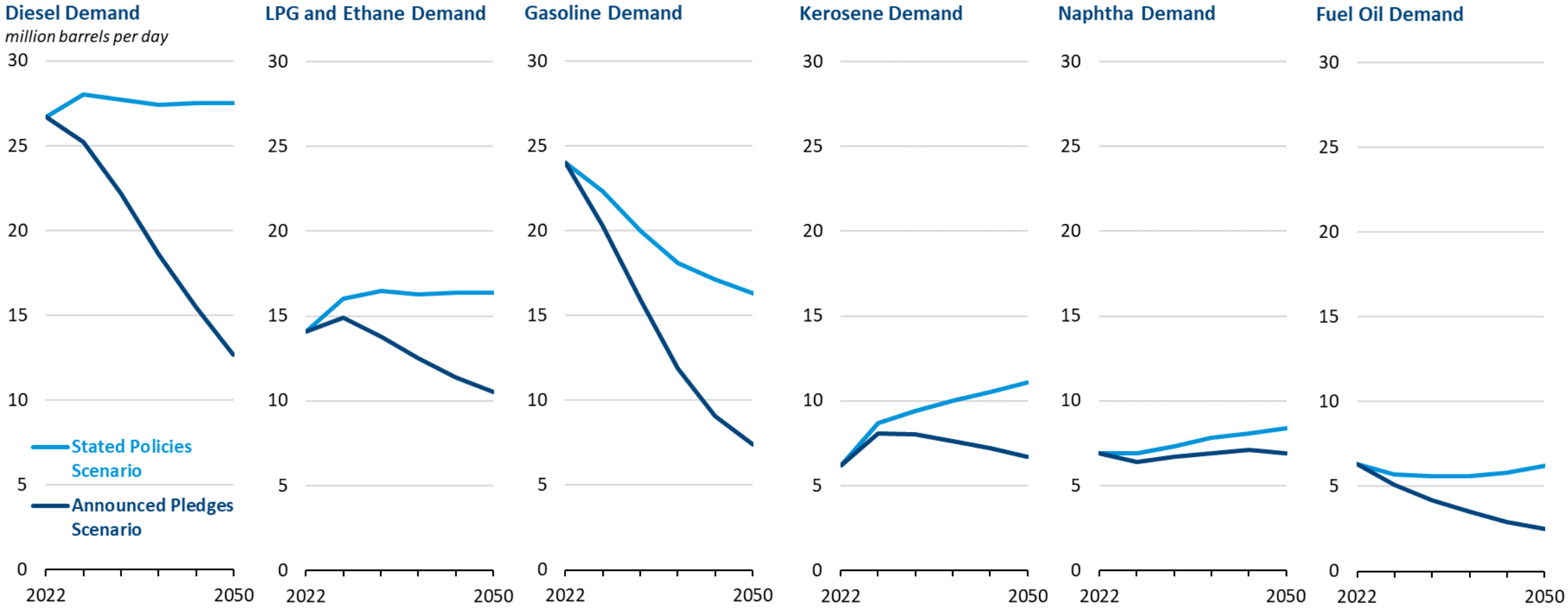
# IEA: Patterns differ by refined product but demand either plateaus or falls by nearly 43%.

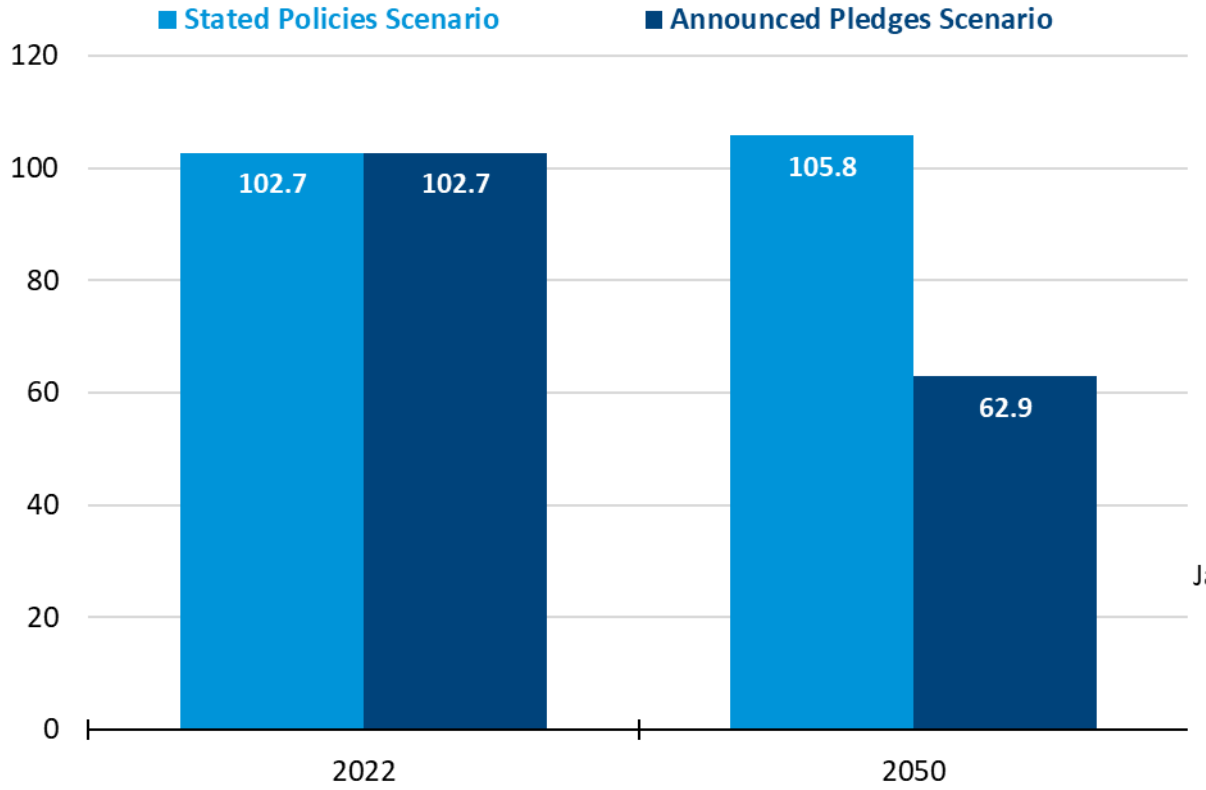



Source: International Energy Agency, World Energy Outlook 2023

# IEA: Two very different refining realities emerge by 2050

**IEA: Change in global refining capacities (2022 to 2050) between scenarios**

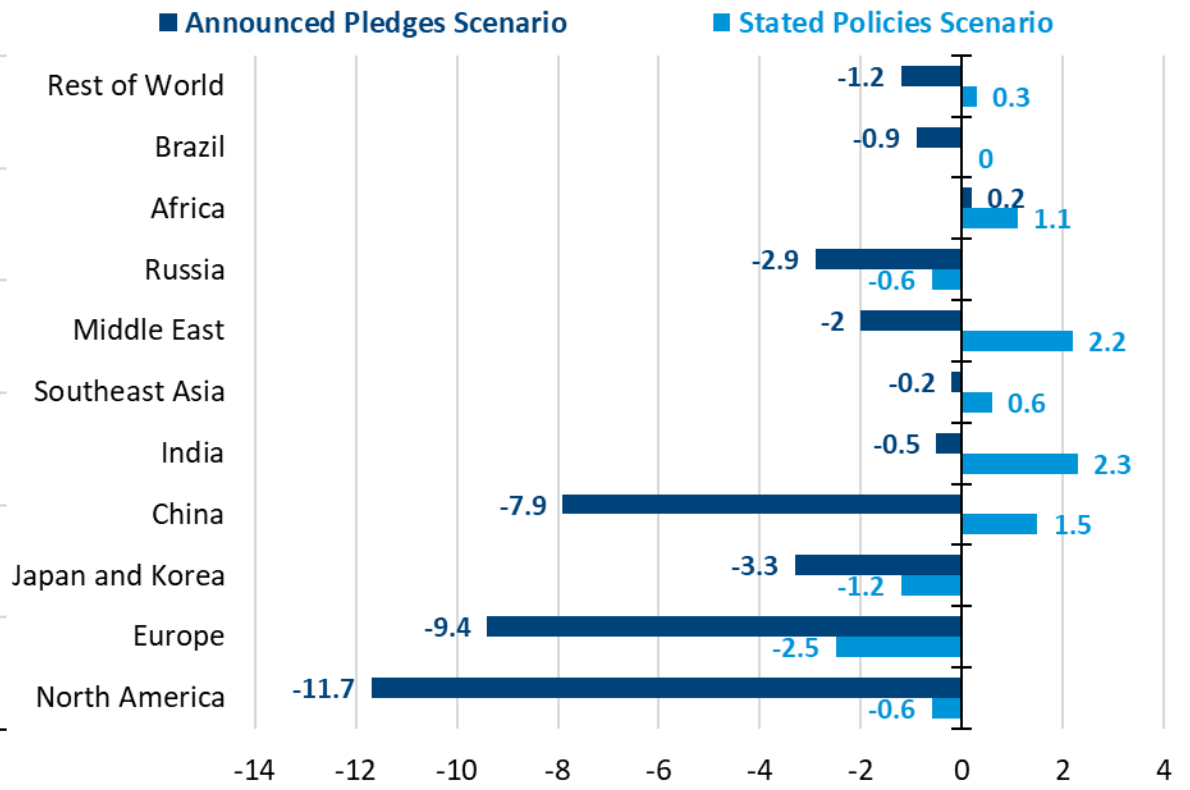
*million barrels per day of refining capacity*




Source: International Energy Agency, World Energy Outlook 2023

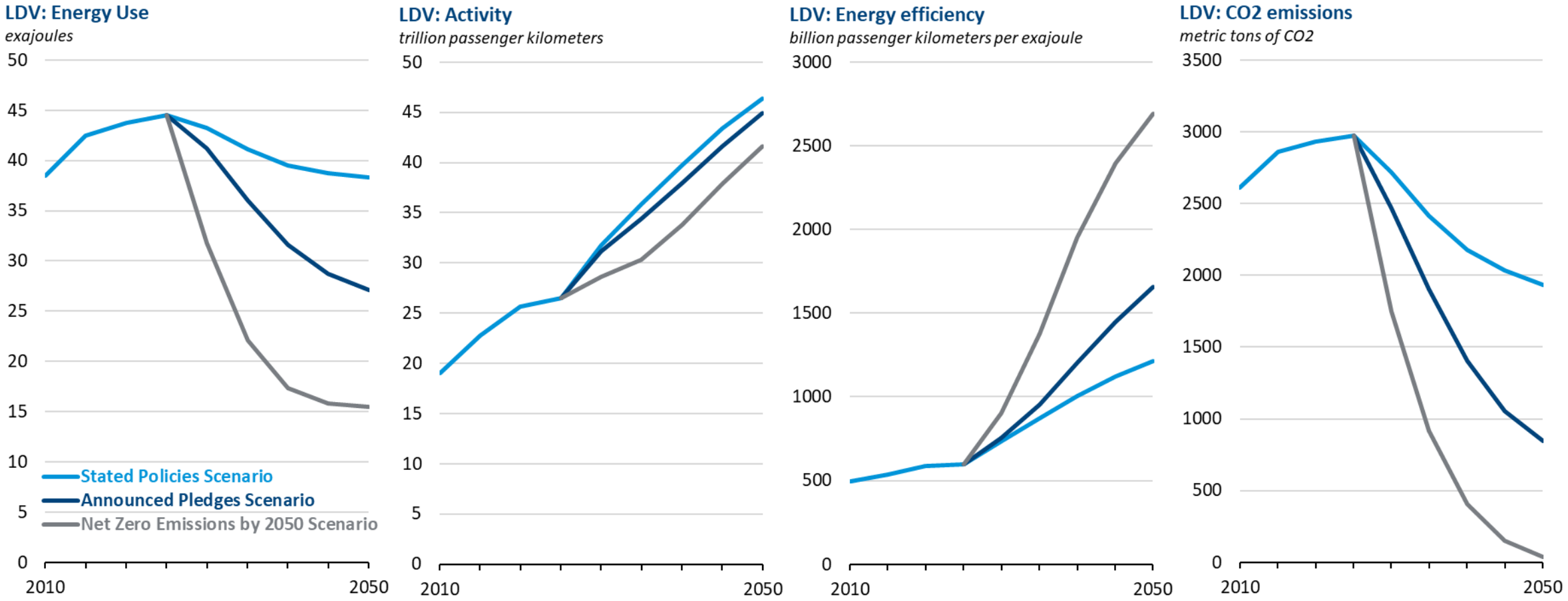
**IEA: Change in regional refining capacities (2022 to 2050) between scenarios**

*million barrels per day of refining capacity*



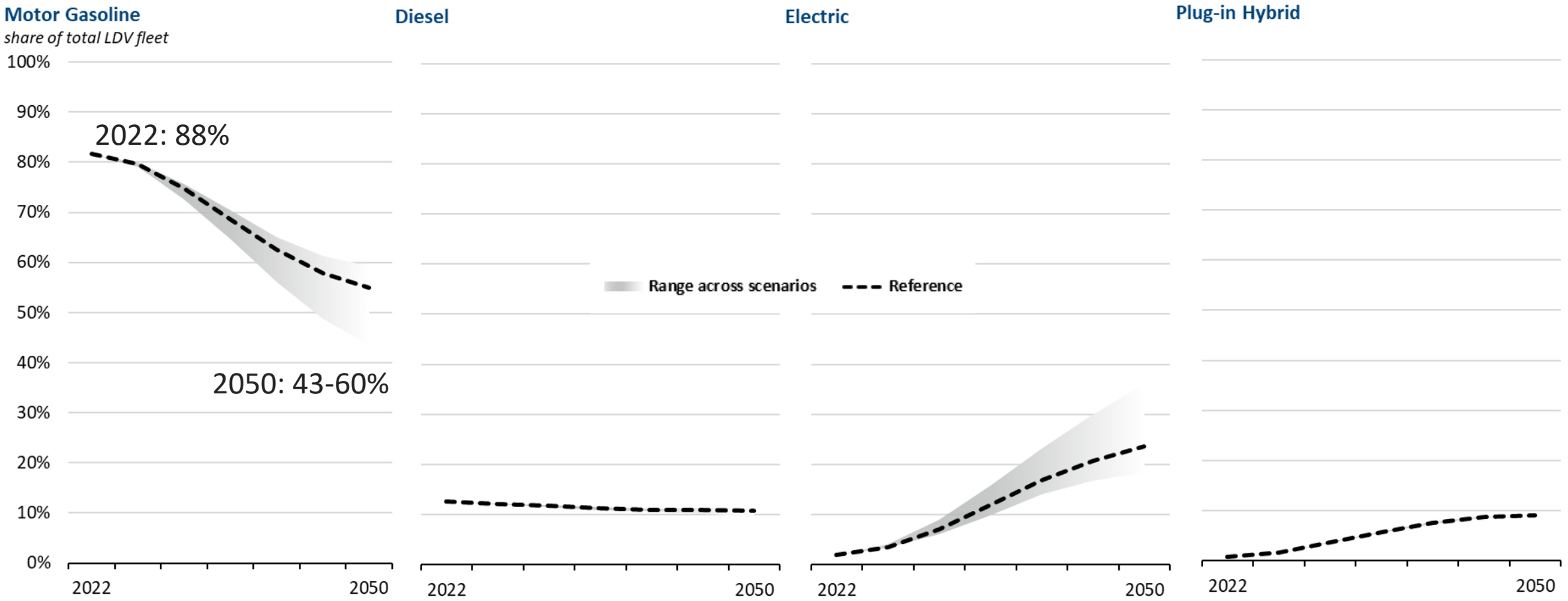

Source: International Energy Agency, World Energy Outlook 2023

# IEA: Scenarios project radical changes to light duty vehicles (LDV) compared with history and current trends




Source: International Energy Agency, World Energy Outlook 2023

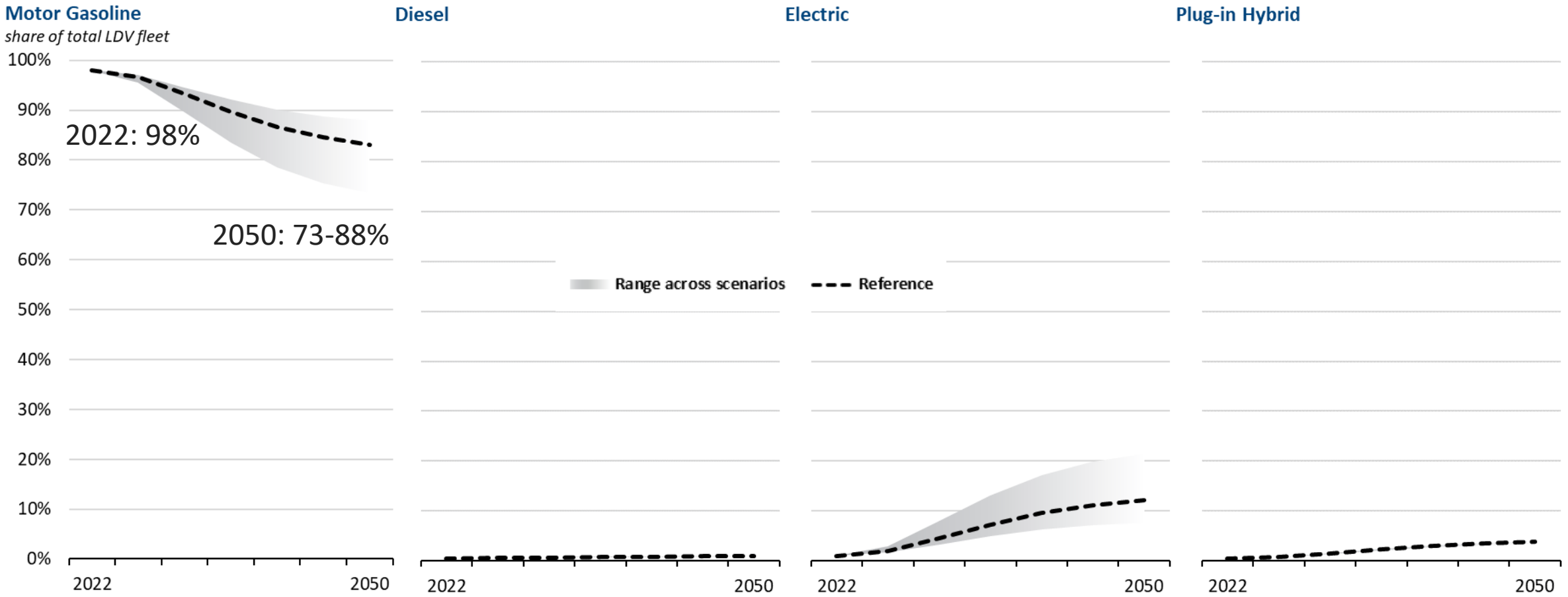
# EIA: Far less drastic changes to global LDV fleet across 7 different scenarios




Note: Shaded areas represent the max and min of the different scenarios. Scenarios included – Reference, High oil prices, low oil price, high economic growth, low economic growth, high zero-carbon technology costs, low zero-carbon technology costs

Source: U.S. Energy Information Administration, International Energy Outlook 2023

# EIA: LDV fleet in rest of the world electrifies faster than the United States

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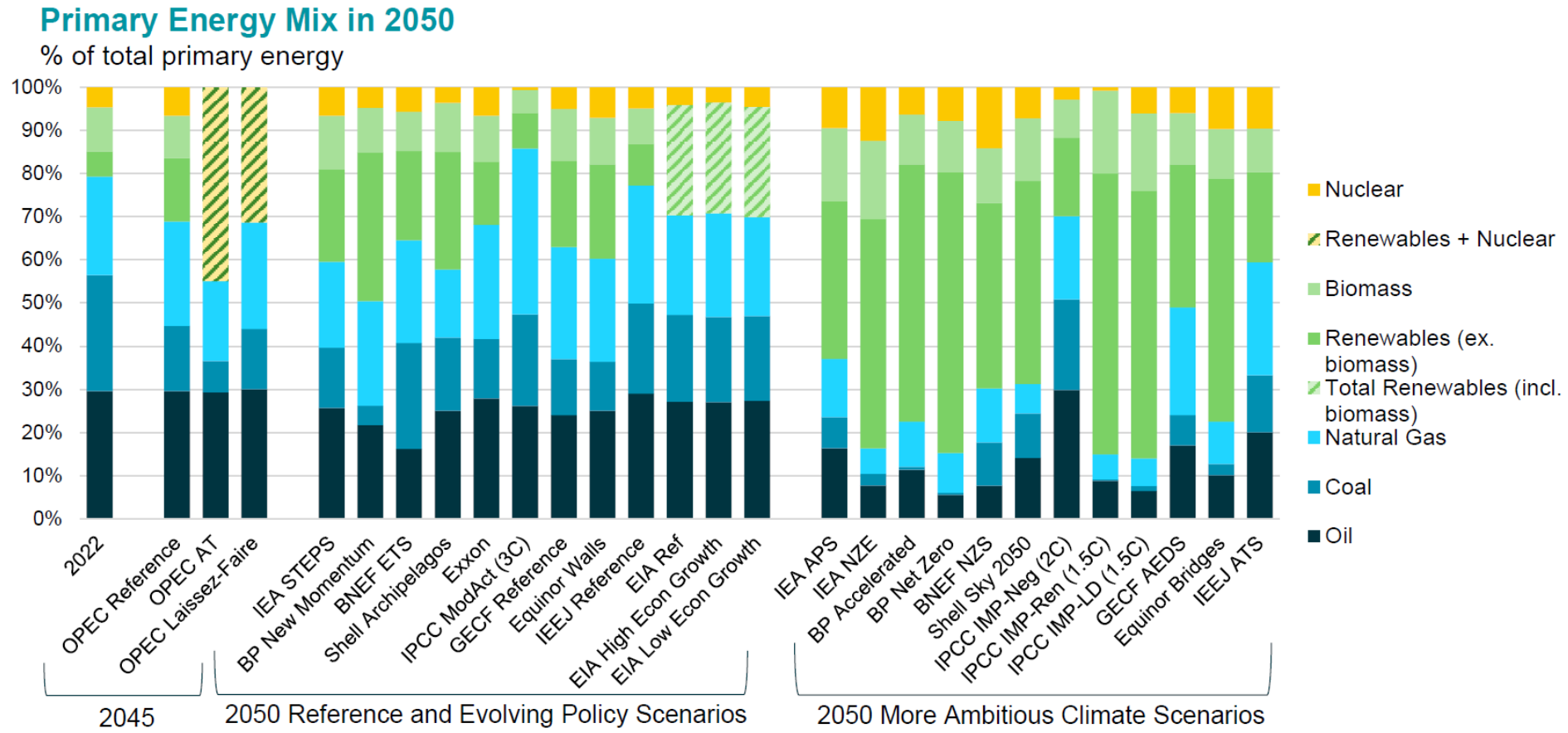
Source: U.S. Energy Information Administration, International Energy Outlook 2023

# No scenario, not even Net Zero, has oil or natural gas share of primary energy demand going to zero by 2050

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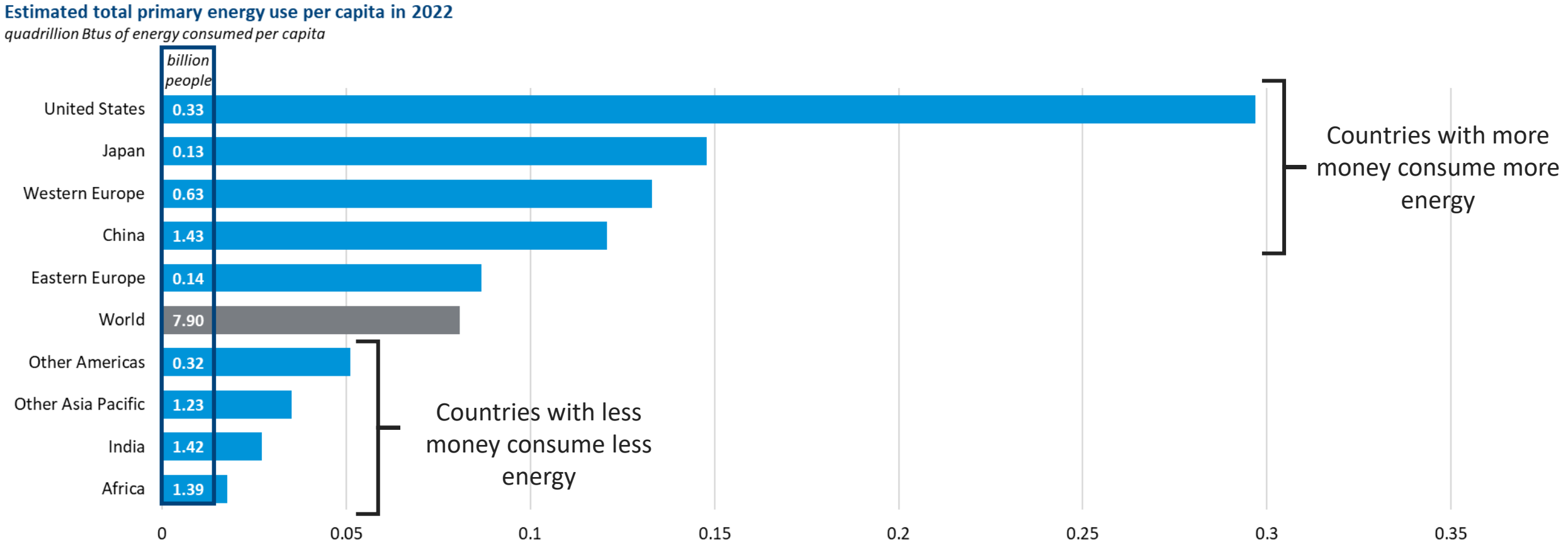
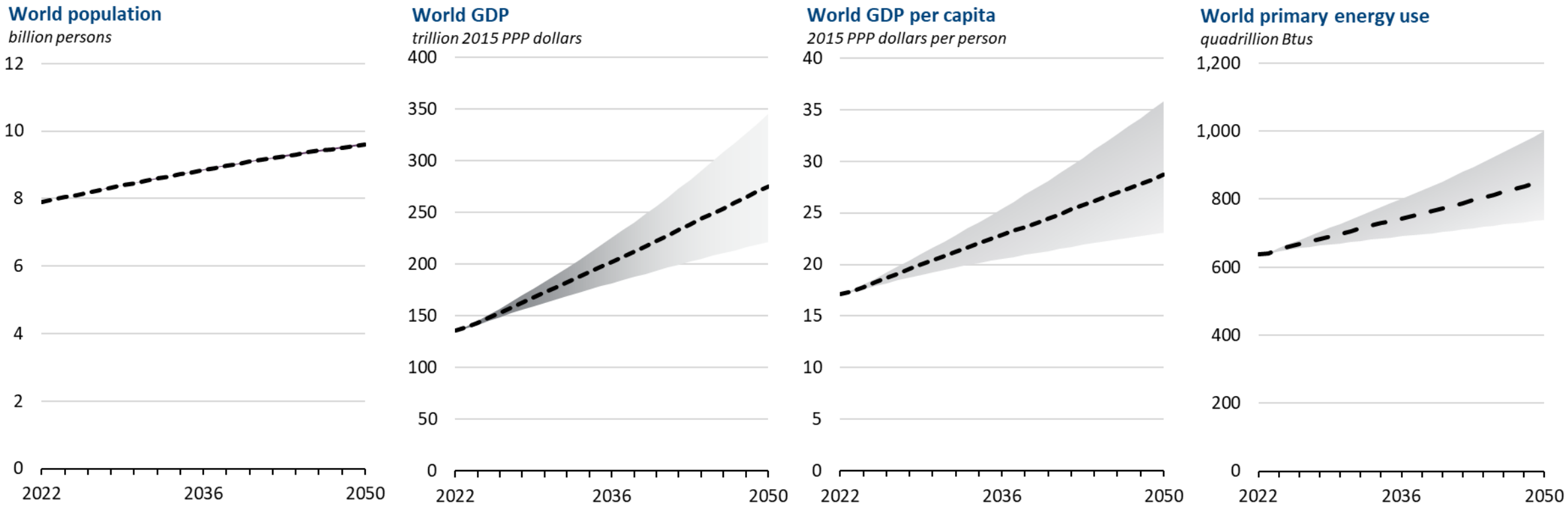
# Truth: Countries with more money consume more energy




Source: U.S. Energy Information Administration, International Energy Outlook 2023

# Population and economic growth are powerful forces driving higher energy consumption

More people + More money = More people with more money = More *energy consumption*

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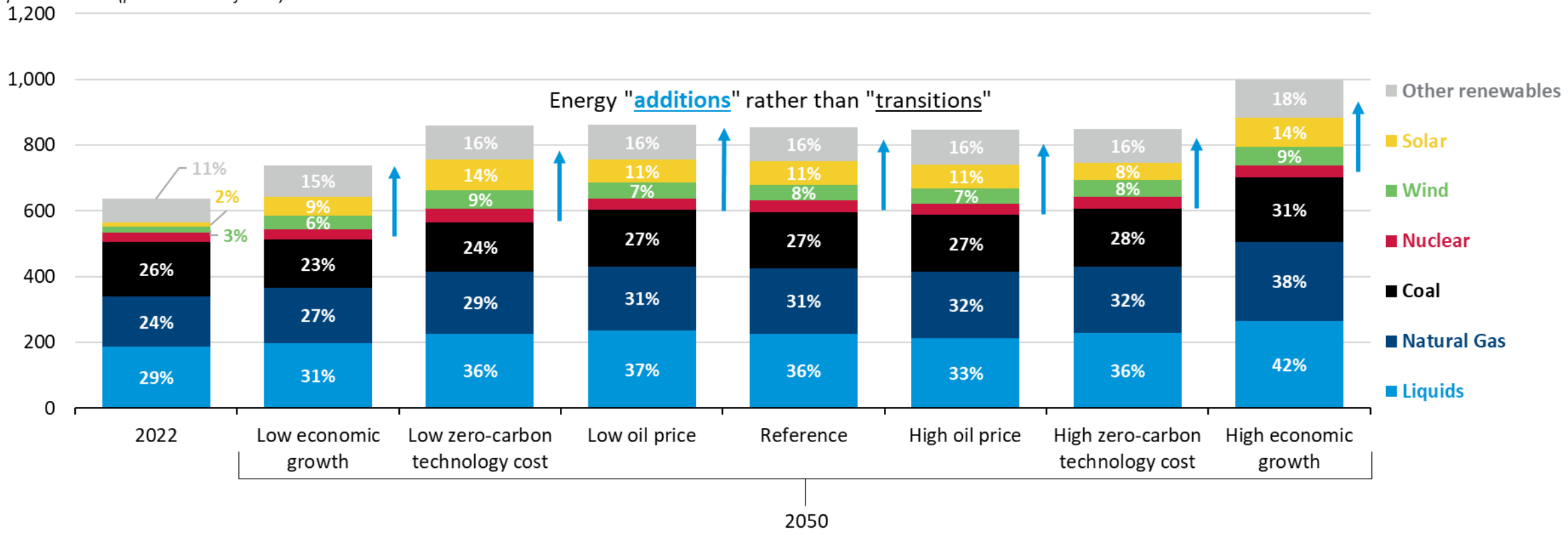
Source: U.S. Energy Information Administration, International Energy Outlook 2023

# The question is: What kind of energy?

**EIA: World primary energy use by fuel and by scenario**

*quadrillion Btus (percent share of total)*




Source: U.S. Energy Information Administration, International Energy Outlook 2023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