

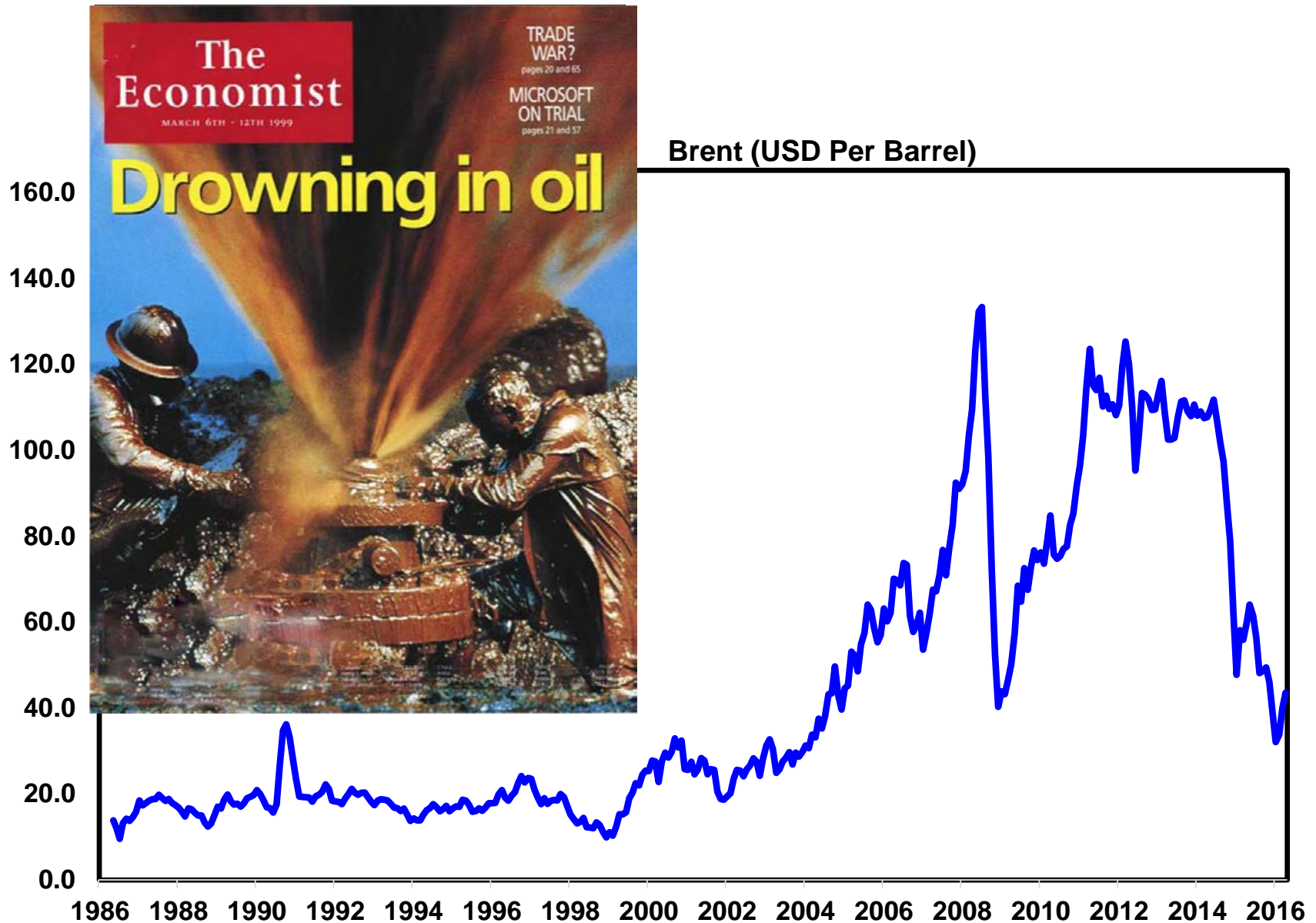


THIS TIME ITS
DIFFERENT; REALLY?

**MUSTAFA
MOHATAREM**

Chief Economist, Public Policy Center

CHARTING THE ENERGY STORY THROUGH 'THE ECONOMIST' COVERS





THE KEY THEME HERE IS THAT

Something happens (shock, production disruption, environmental hazard, political, etc.) that succeeds in raising price, making us believe we've hit the peak

Demand Response

Reduced Consumption of Oil, Reduced Vehicle Miles Traveled (VMT), Search for Efficiency

Supply Response

New Sources of Supply; Search for Alternatives (natural gas, renewables, etc.)

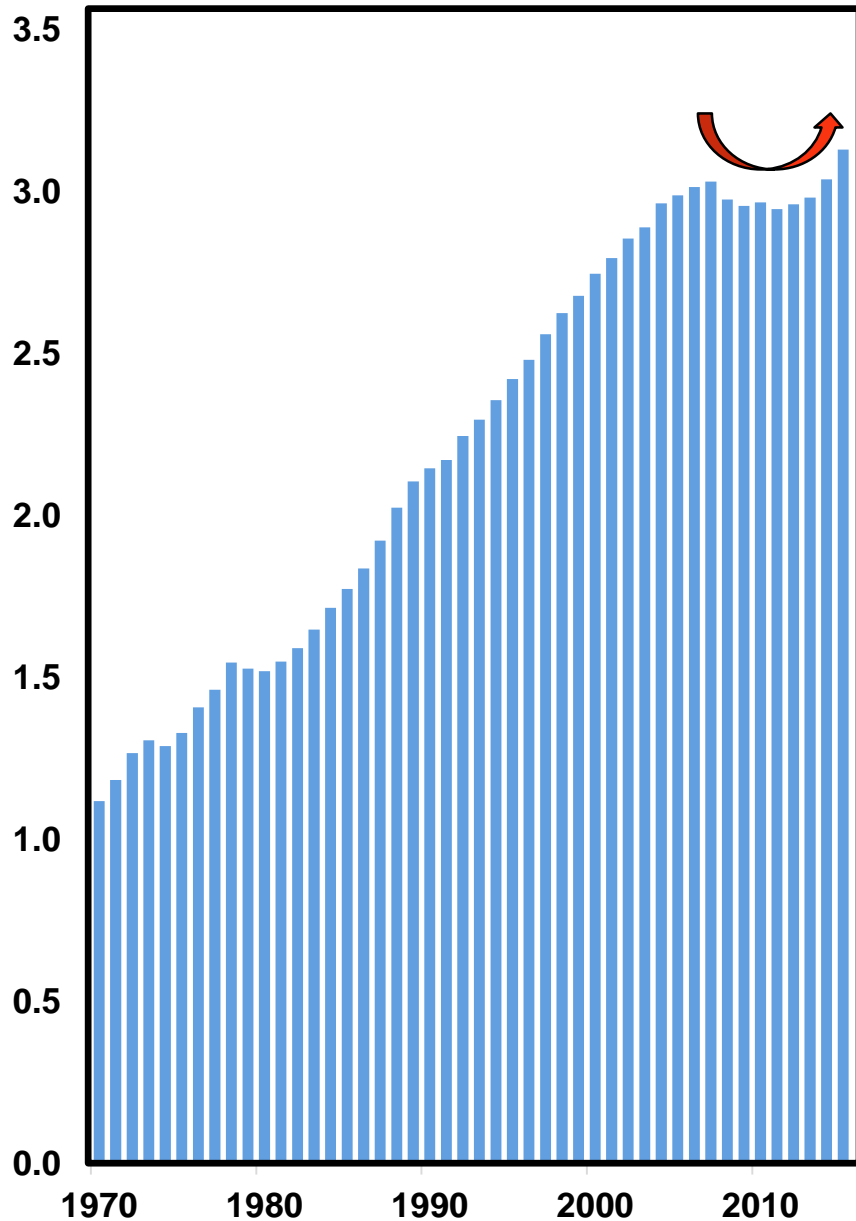
Technology Response

Hybrids, EVs, etc.

Political Response

*CAFE Regulations / ZEV mandates
Paris Climate Talks*

U.S. Vehicle Miles Traveled (Trillion Miles)



The long rise in the VMT reversed in 2008 partially due to the oil price spike that year and the start of the 'Great Recession'

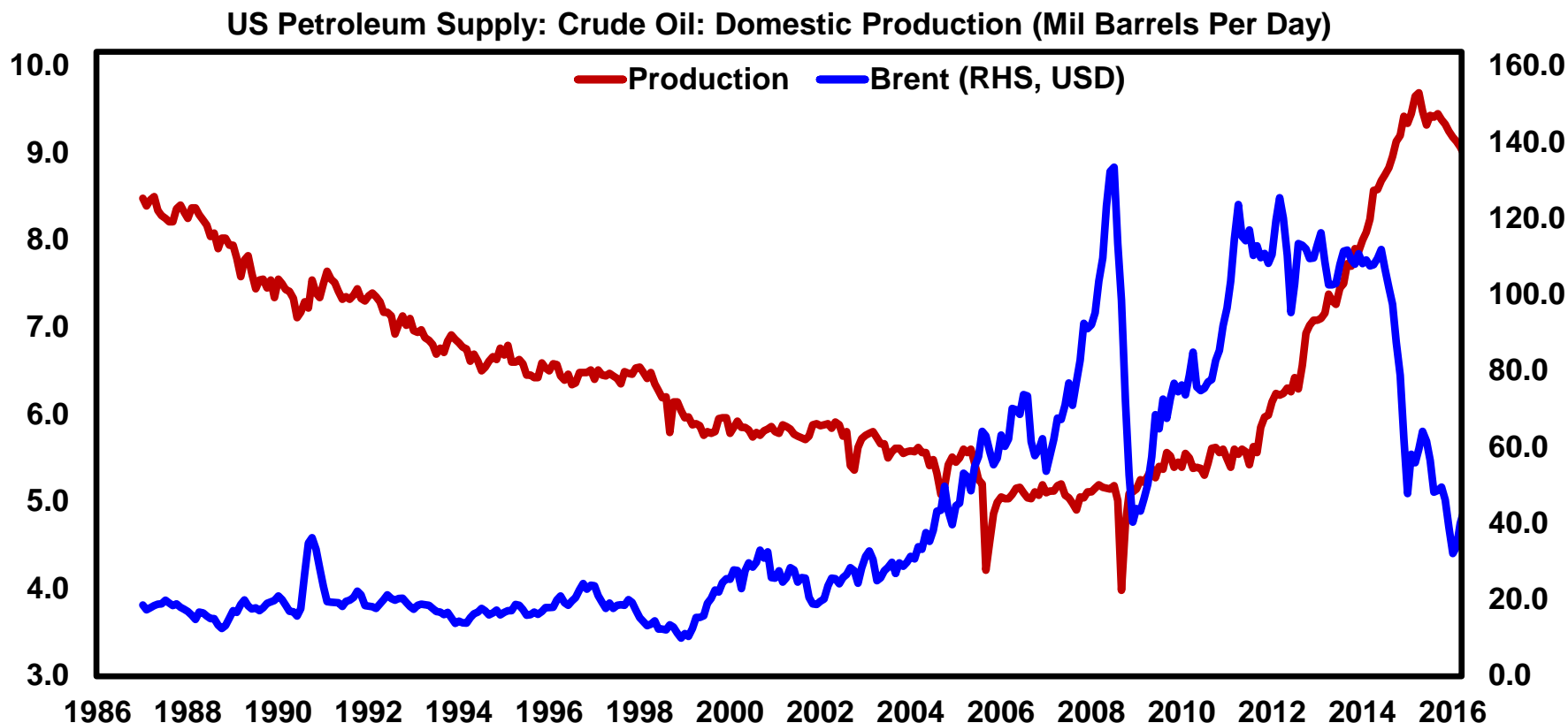


THE SUPPLY RESPONSE.

IN ONE CASE... DRILL, BABY, DRILL. ONE ALTERNATIVE WAS TO INVEST AND BOOST U.S. OIL PRODUCTION, LESSENING THE DEPENDENCE ON FOREIGN OIL

[President Obama] criticized Republicans who have called for the country to increase its own oil production, declaring that “**anyone who tells you we can drill our way out of this problem doesn’t know what they’re talking about.**”

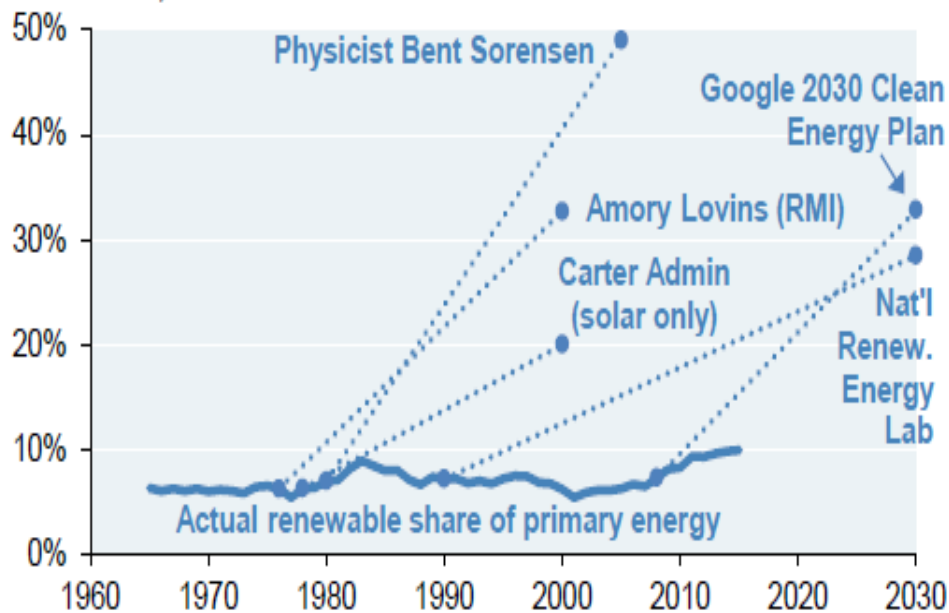
- New York Times, March 1, 2012



Source: EIA

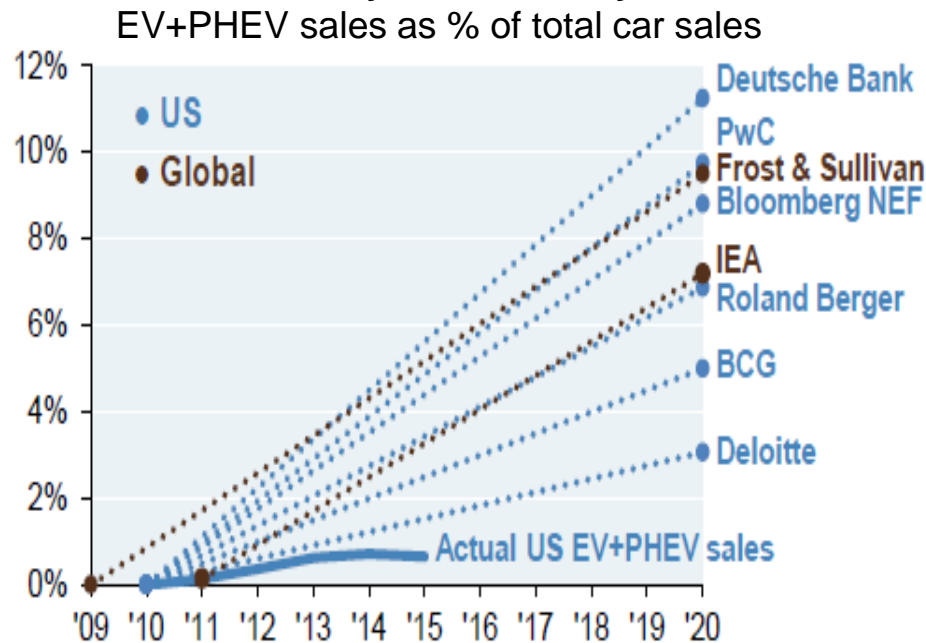
THE JOURNEY TO A RENEWABLE ENERGY FUTURE IS TAKING LONGER THAN MANY ANALYSTS AND AGENCIES EXPECTED.

The share of US primary energy coming from renewable sources, and some notable forecasts



Source: EIA, listed authors, Vaclav Smil, JPMAM 2015.
 Note: Renewables include wind, solar hydropower, geothermal, biomass, wood and waste

Another generation of electric car projections out of sync with reality

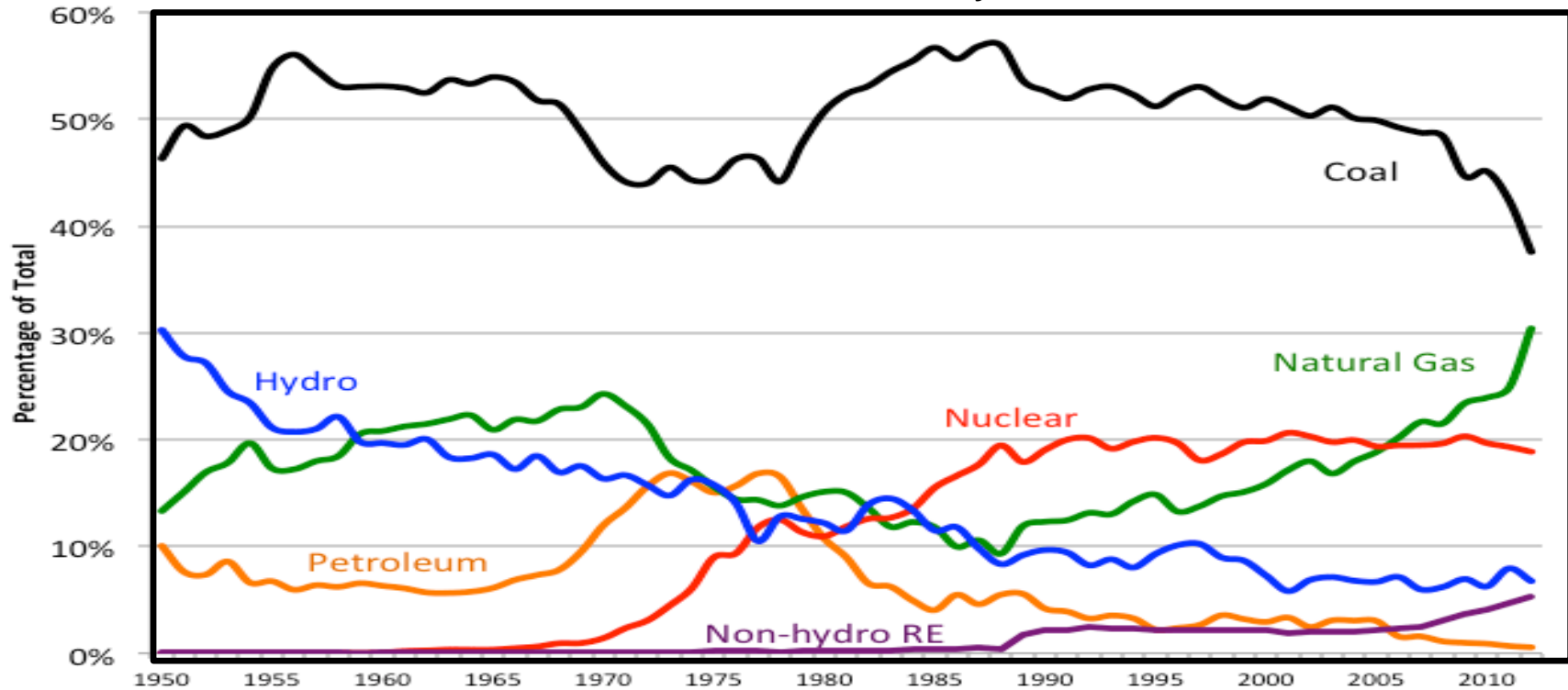


Source: DOE, BEA, and listed organizations. 2015.
 Note: global EV+PHEV sales in 2015 were also around 0.6%

Source: JP Morgan

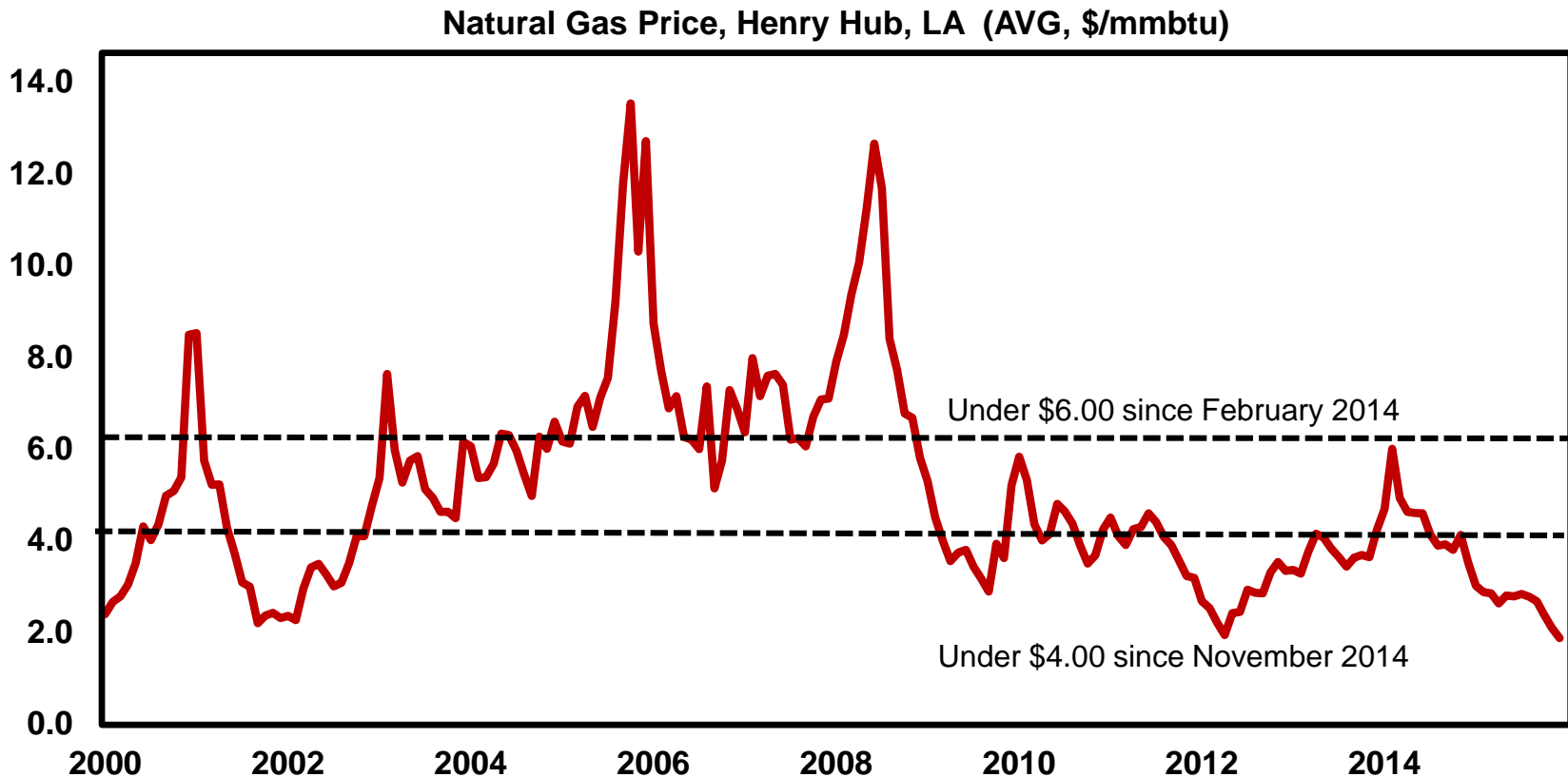
THE SHIFT IN ENERGY SOURCE FOR POWER GENERATION ACROSS THE YEARS DEMONSTRATES THE SEARCH FOR ALTERNATIVES AS NEEDS CHANGES

Net U.S. Power Generation Share by Source, 1949-2012



Source: National Renewable Energy Laboratory

**NATURAL GAS PRICES HAVE DECLINED IN THE LAST SEVERAL YEARS;
CONTRIBUTING TO THE SHIFT TO NATURAL GAS SEEN ON THE PREVIOUS SLIDE**



REGULATORS TYPICALLY SLOW TO REACT TO REACT TO NEW TECHNOLOGIES



**LOCOMOTIVE ACT OF 1865
“RED FLAG ACT”**

**HORSELESS CARRIAGES (CARS) HAD TO BE
PROCEEDED WITH SOMEONE WITH A RED FLAG
FOR SAFETY PURPOSES**



JITNEYS - 1914

**AN EARLY FOR OF RIDE SHARING
ABOUT 150,000 RIDES A DAY IN LA, YET
REGULATED OUT OF EXISTENCE BY 1919**

157,000 UBER RIDES PER DAY IN LA IN 2016...

Source: AEI

200 MILE RANGE



OF COURSE, THE POLITICAL AND REGULATORY RESPONSE HAS IMPACTS AS WELL

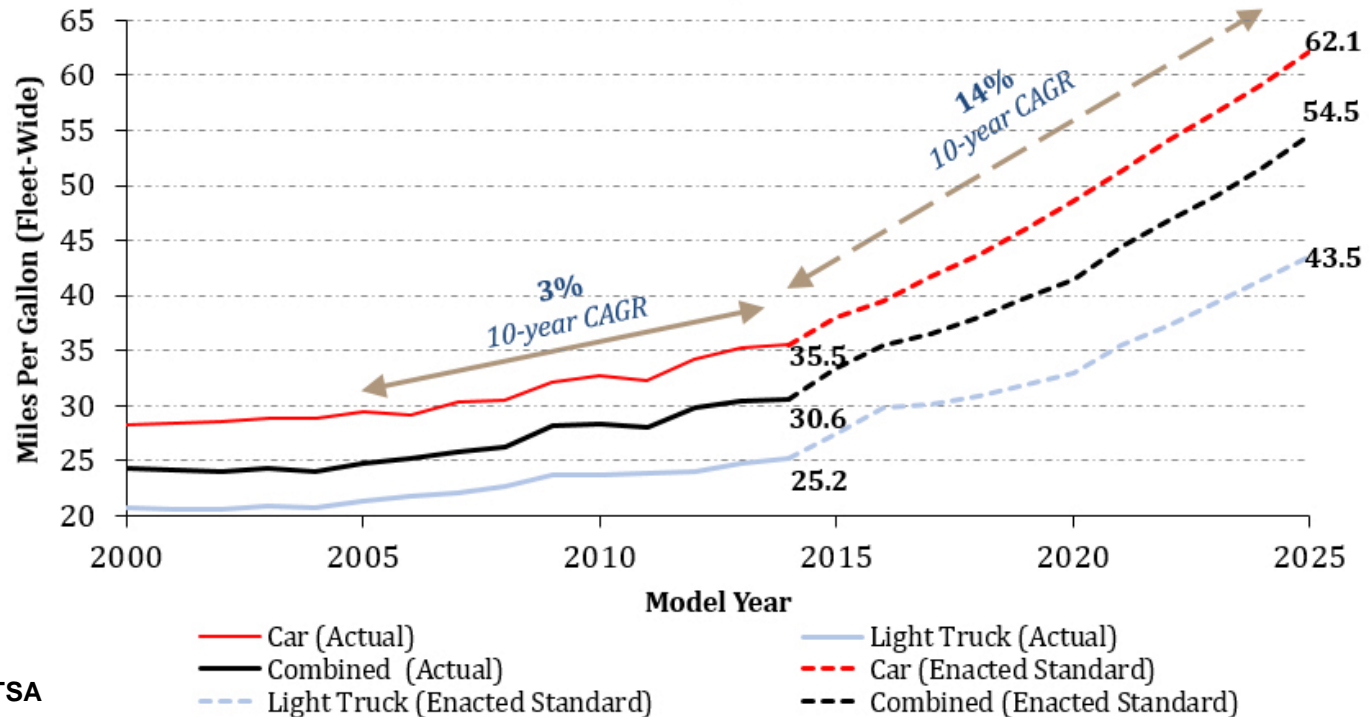
U.S. EPA and NHTSA issuance on extending the National Program to further reduce greenhouse gas GHG emissions and improve fuel economy through the Clean Air Act and the Corporate Average Fuel Economy (CAFE) standards.

Benefits from Greenhouse Gas Reductions and Less Oil Dependency

Over the lifetimes of the vehicles sold in Model Years 2017 -2025 standards, this program is projected to save approximately 4 billion barrels of oil and reduce GHG emissions by 2 billion metric tons, with net benefits to society in the range of \$326 - \$451 billion. These savings would come on the top of savings that would already be achieved through the continuation of the MY 2016 standards

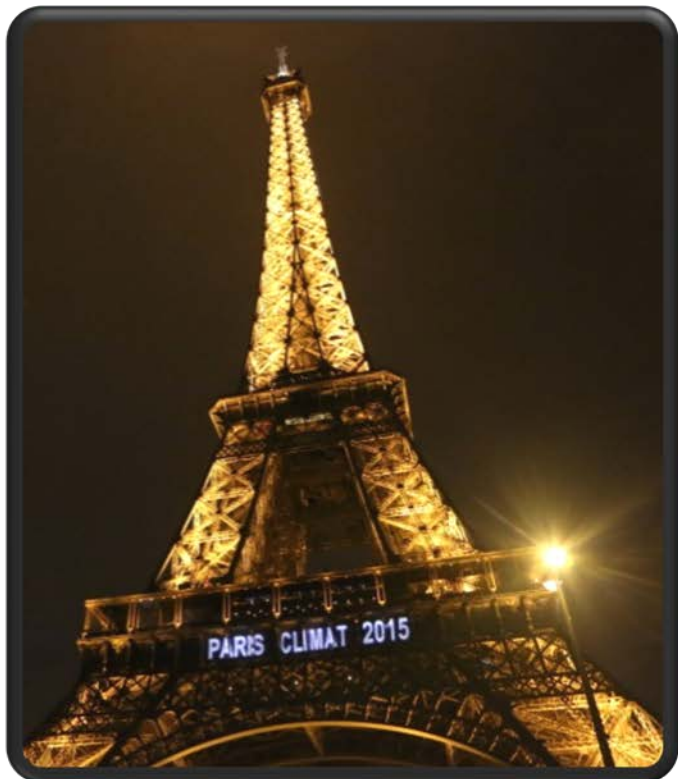
Office of Transportation and Air Quality: August 2012

Historical Fleet-Wide Fuel Economy & Enacted CAFE Standards



Source: EPA / NHTSA

AT LEAST WE'LL ALWAYS HAVE PARIS...



“Climate negotiation breakthroughs are a dime a dozen. They live or die in the details, and the thunderous applause drowning out even the noise from the innumerable private jets departing Paris has obscured three crucial parameters that will make this agreement only the latest exercise in delusion:

*Precisely what has been agreed,
who actually will pay the costs,
and the degree to which the “planet” has been
“saved.”*

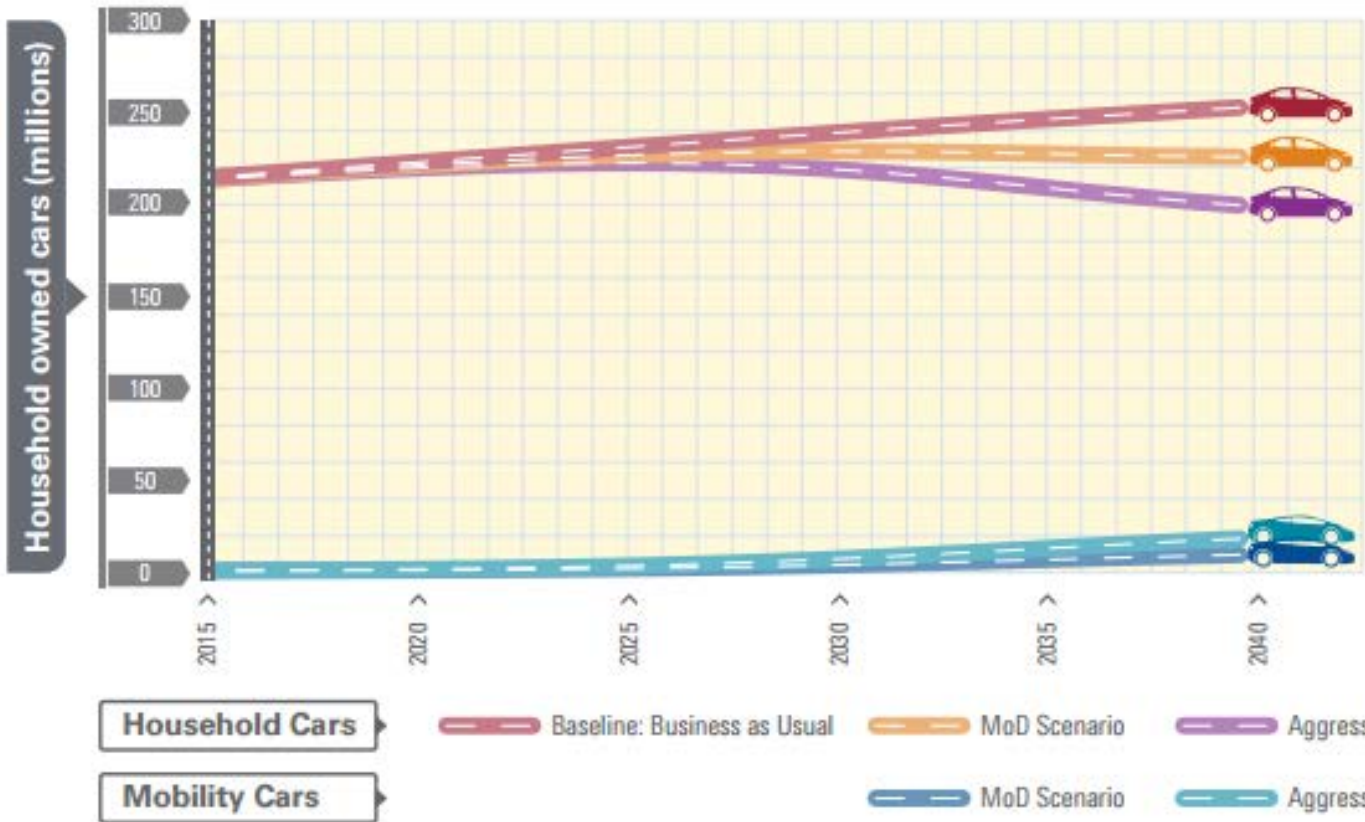
American Enterprise Institute

However, If the agreement is fully implemented, it is likely that oil production growth will be stymied, contributing to a ‘lower for even longer’ price environment and discourage innovation in cleaner energy technologies



CAR AND RIDE SHARING VIEWS HIGHLIGHT CONFLICTING TRENDS ON INDUSTRY SALES.

KPMG PROJECTION: THE DECLINE OF THE HOUSEHOLD CAR



Notes: Our model depicts two scenarios in which U.S. households begin to gradually own fewer cars in response to the rise of Mobility on Demand (MoD).

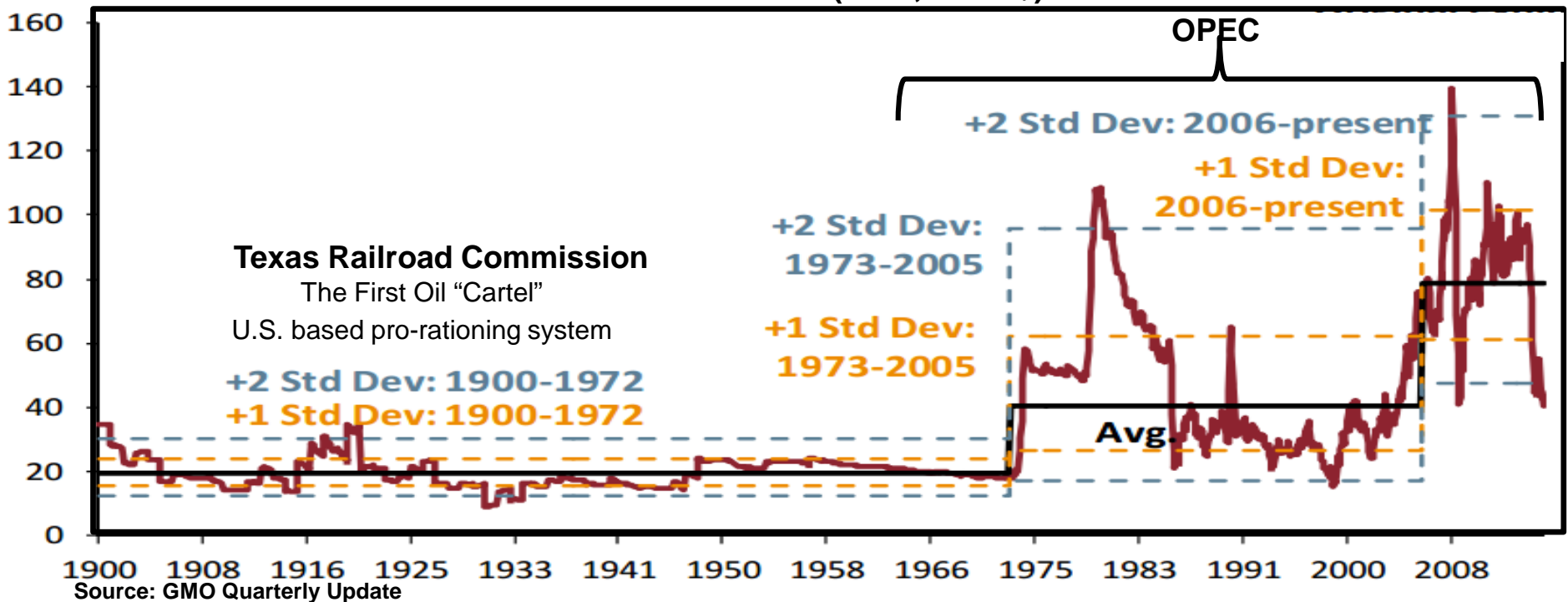
As household-owned cars decline, there is a rise in fleet-like Mobility Cars to supplement transportation needs.

Sources: Federal Reserve Economic Data (FRED), U.S. Census Bureau American Community Survey, Bureau of Economic Analysis

Source: KPMG, "Me, My Car, My Life"

THE FEAR IS ALWAYS, "ARE THESE NEW HIGH PRICES PERMANENT? IS IT A PARADIGM SHIFT?"

Oil -- the "Original Paradigm Shift"
WTI Per Barrel (Real, 2010 \$)



Source: GMO Quarterly Update

THE WORLD BANK REFERS TO OPEC AS THE ONLY SURVIVING [FOR NOW] COMMODITY ORGANIZATION SEEKING TO ACTIVELY MANAGE A GLOBAL COMMODITY MARKET



There are some differences between OPEC and the earlier commodity agreements:

“OPEC does not have a legal clause on how to intervene when market conditions warrant, thus, allowing it to respond flexibly to changing circumstances.

OPEC could be “dormant” for some time and re-emerge at a later date

OPEC’s actions and effectiveness may well be limited as it competes with nimble new technologies and producers.”

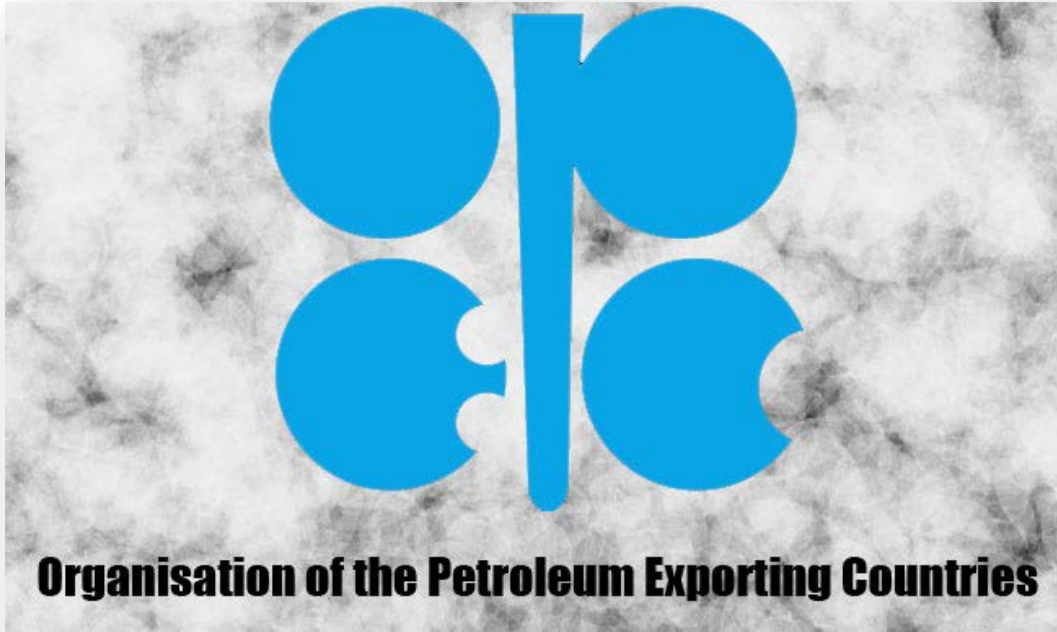
HOWEVER, DUE TO STRONG ANTI-TRUST LAWS, OPEC CAN NOT BRING U.S. PRODUCERS INTO THE CARTEL

Source: World Bank



Global Economics
and Trade

OPEC'S "CARTEL" ISN'T THE FIRST ONE TO COME TO AN END



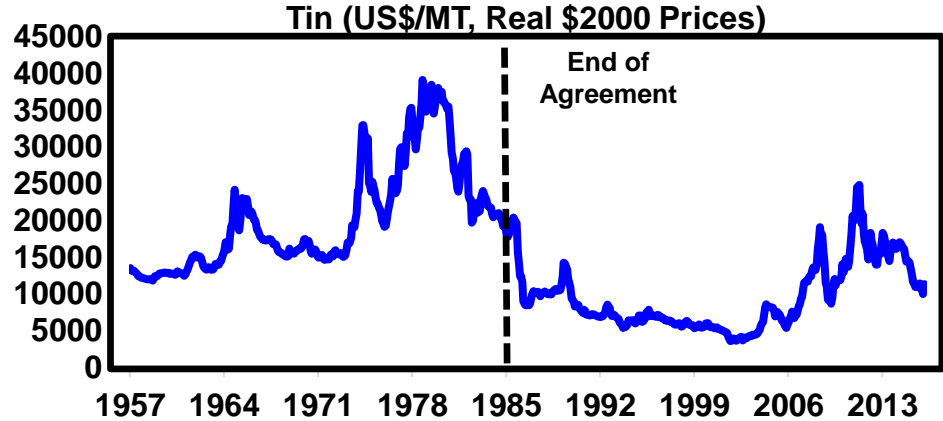
OPEC Countries



“EVERY MAJOR BULL EVENT IS CALLED A PARADIGM SHIFT BUT THEY ALMOST NEVER EXIST. ALMOST NEVER. BUT NOT NEVER, EVER.” - JEREMY GRANTHAM

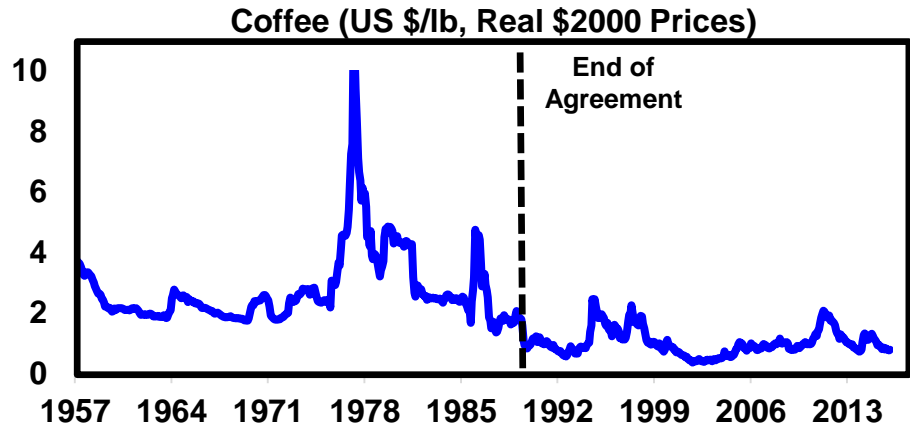
Tin: First negotiated in 1954 with the objective of maintaining prices within a desired, the International Tin Agreement (ITA) collapsed in 1985. The Agreement made tin prices higher and stable, and as a result, **new producers outside the Agreement entered the market:**

Higher tin prices also encouraged the development of a substitute product, aluminum, which gained market share by capturing the growing demand from the beverage can producers.



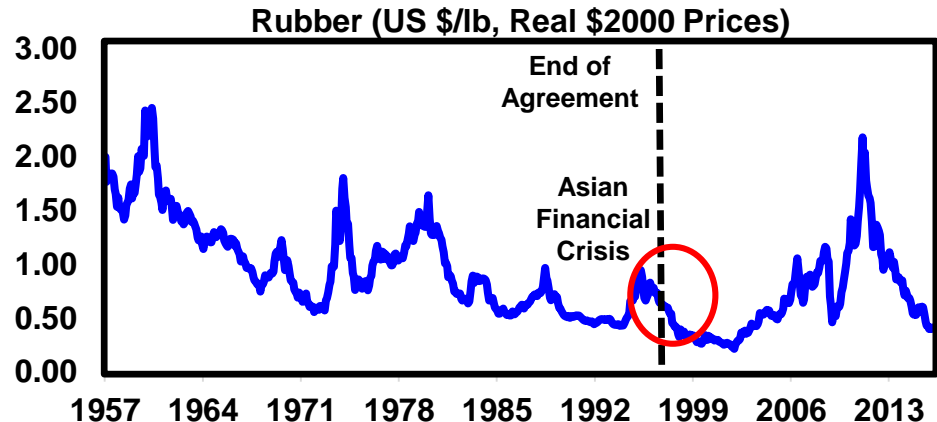
Coffee: In 1962, coffee-producing countries, accounting for 90% of global coffee output, and almost all developed coffee-consuming countries signed the International Coffee Agreement (ICA) with the objective of stabilizing world coffee prices through mandatory export quotas.

Elevated coffee prices encouraged the emergence of new producers. In 1970, Vietnam produced just 0.7% of global production. It now accounts for 20 percent of global coffee production.



Rubber: The Rubber Cartel collapsed during the Asian financial crisis due to currency developments of three key producers, Indonesia, Malaysia, and Thailand.

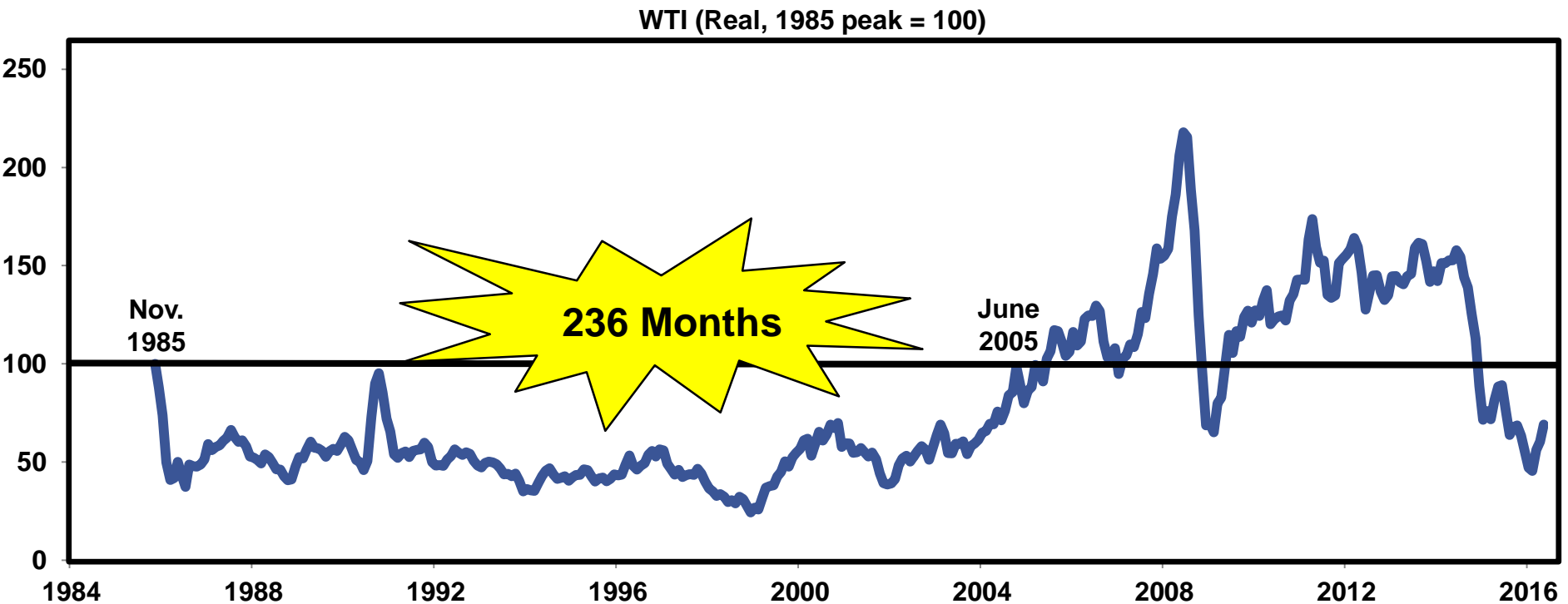
However, the currencies devalued sharply during the Asian crisis and raised the local-currency prices of rubber, **triggering a production expansion** in the rubber pricing mechanism. This inconsistency eventually led to the collapse of the agreement.



Source: World Bank / Haver Analytics

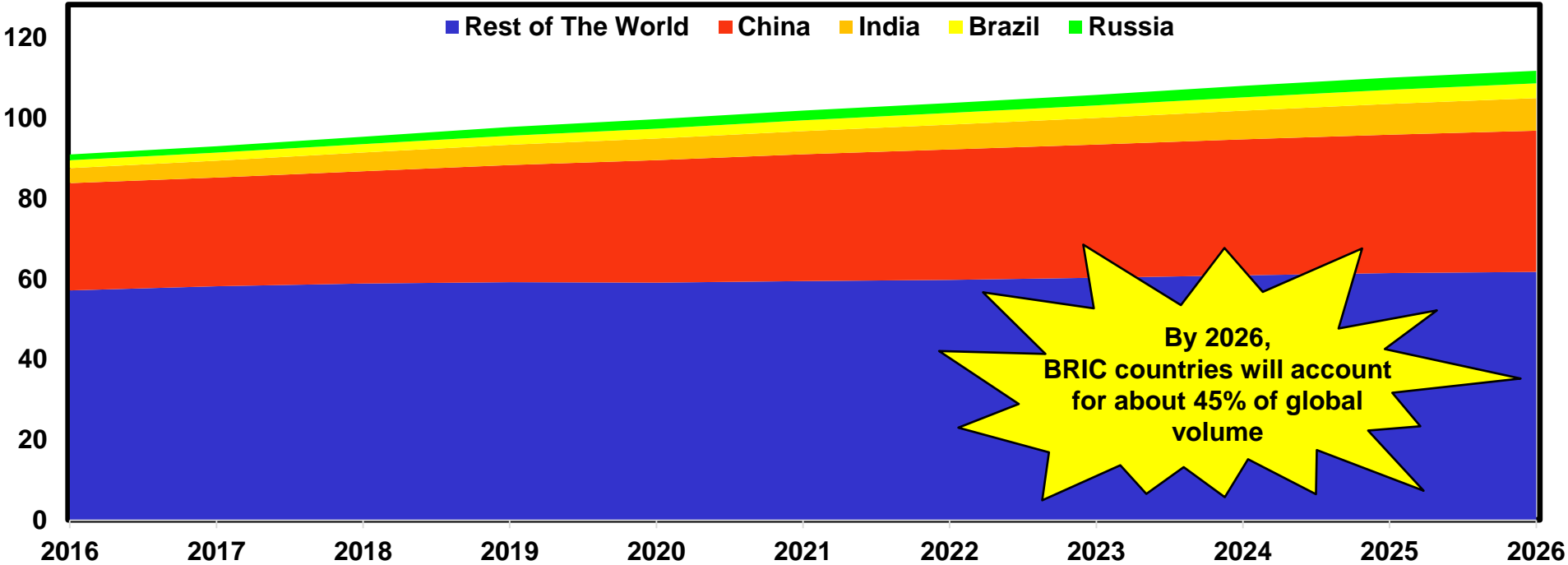
OIL PRICES COULD STAY LOWER FOR LONGER

- The crude oil market experienced a similar drop in 1986 as we're seeing today, as Saudi Arabia and neighboring countries maintained production levels even as North Sea oil production increased.
 - More similarities between 1986 decline and today's drop than with the drop associated with the great recession of 2008 – 2009
 - In the 1986 drop, prices declined about 63% in 8 months; adjusted for inflation, the price did not return to its prior peak until mid-2005, or 236 months. (about 20 years!)
- Expected that low prices will be maintained for 2016 – 2017 with potential for extension into the out years.



EMERGING ECONOMIES COULD HELP CLOSE THE SUPPLY / DEMAND GAP OVER TIME

Vehicle Sales (Mils.)



Source: IHS

THANK YOU!

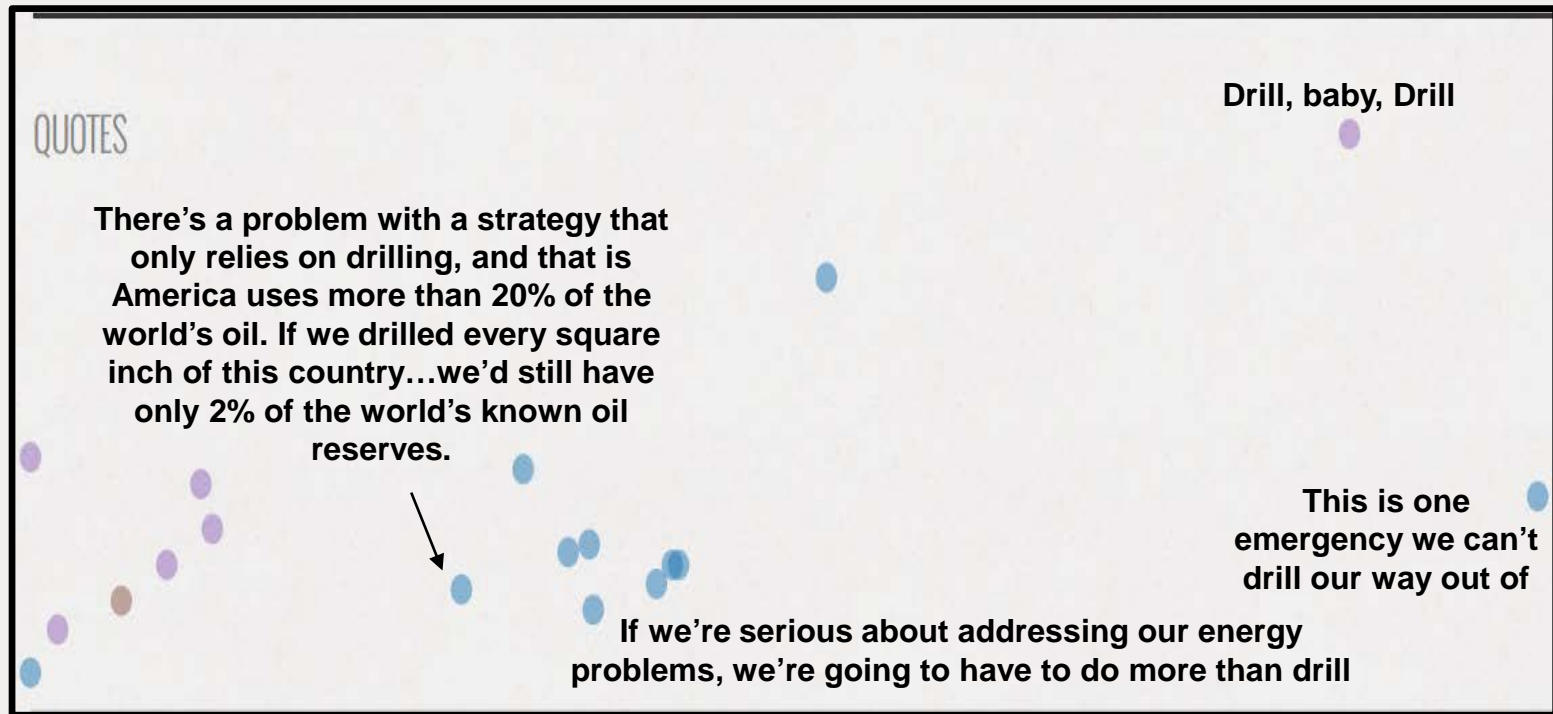


BRANDS THAT INSPIRE PASSION AND LOYALTY



MAJOR MEDIA GOT IT WRONG

US Petroleum Supply: Crude Oil: Domestic Production (Mil Barrels Per Day)



Overall Frequency

A score based on the a count for the frequency of each work in the quote as compared with the other quotes. This is then divided by a fraction of the total number of words in this quote

Source: Inarticle



Quote Frequency

Same as X, but compared to all of the words in every article. The hope is for densely meaningful quotes to score highly, and for similar quotes, used by different publishers, to be grouped together.