

PREDICTING THE PRICE OF OIL: SCIENCE, ART OR COMEDY?

1

Michael C. Lynch

January 12, 2020

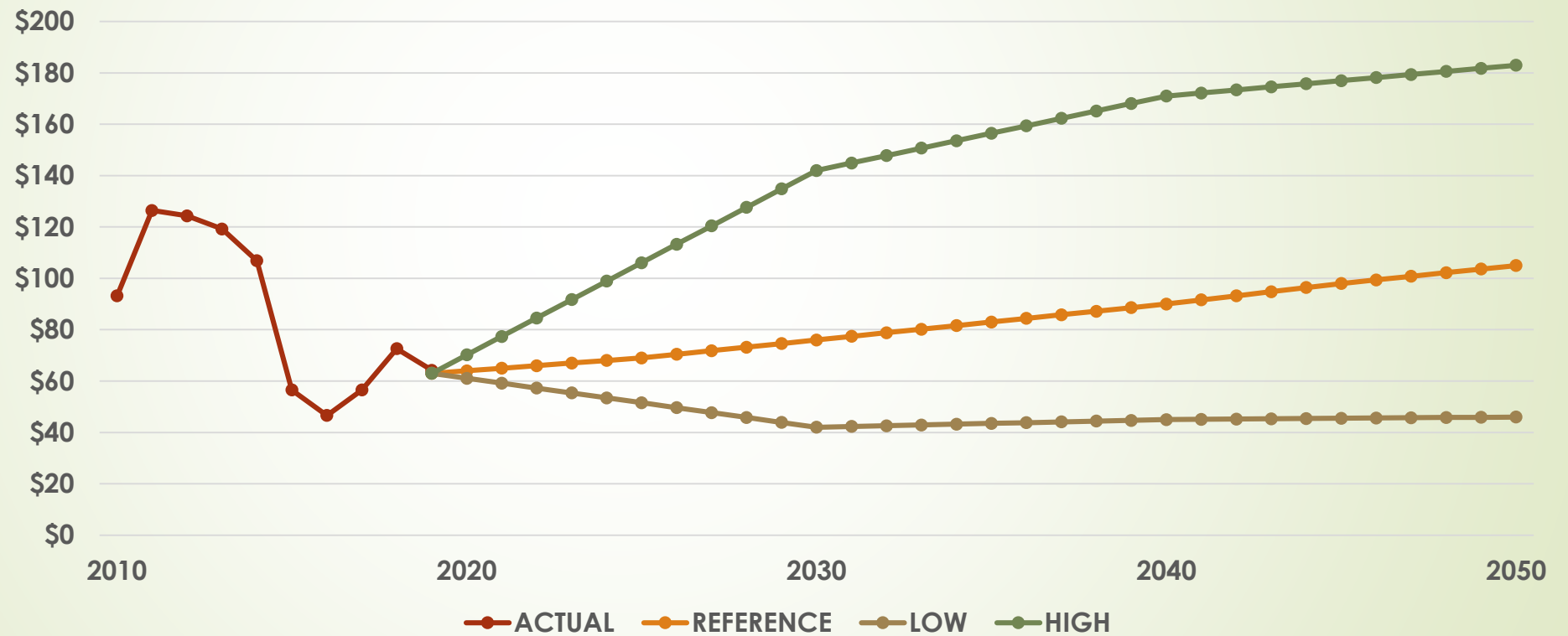
lynch@energyseer.com

THE BOOK IS FINALLY HERE! (JULY 2016)



Primary lesson is that much knowledge is superficial,
and incorrect. In-depth understanding usually trumps clichés.

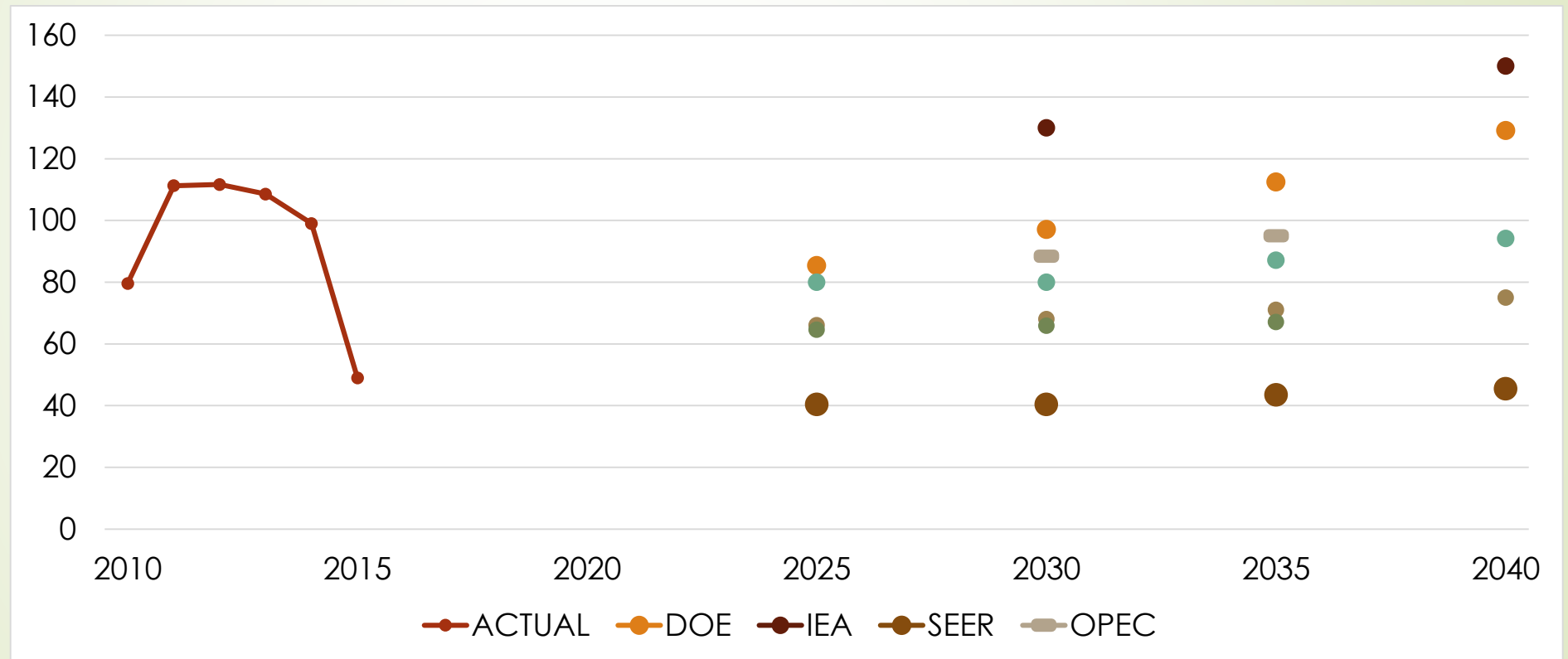
TYPICAL PRICE EXPECTATIONS (DOE 2020 SCENARIOS)



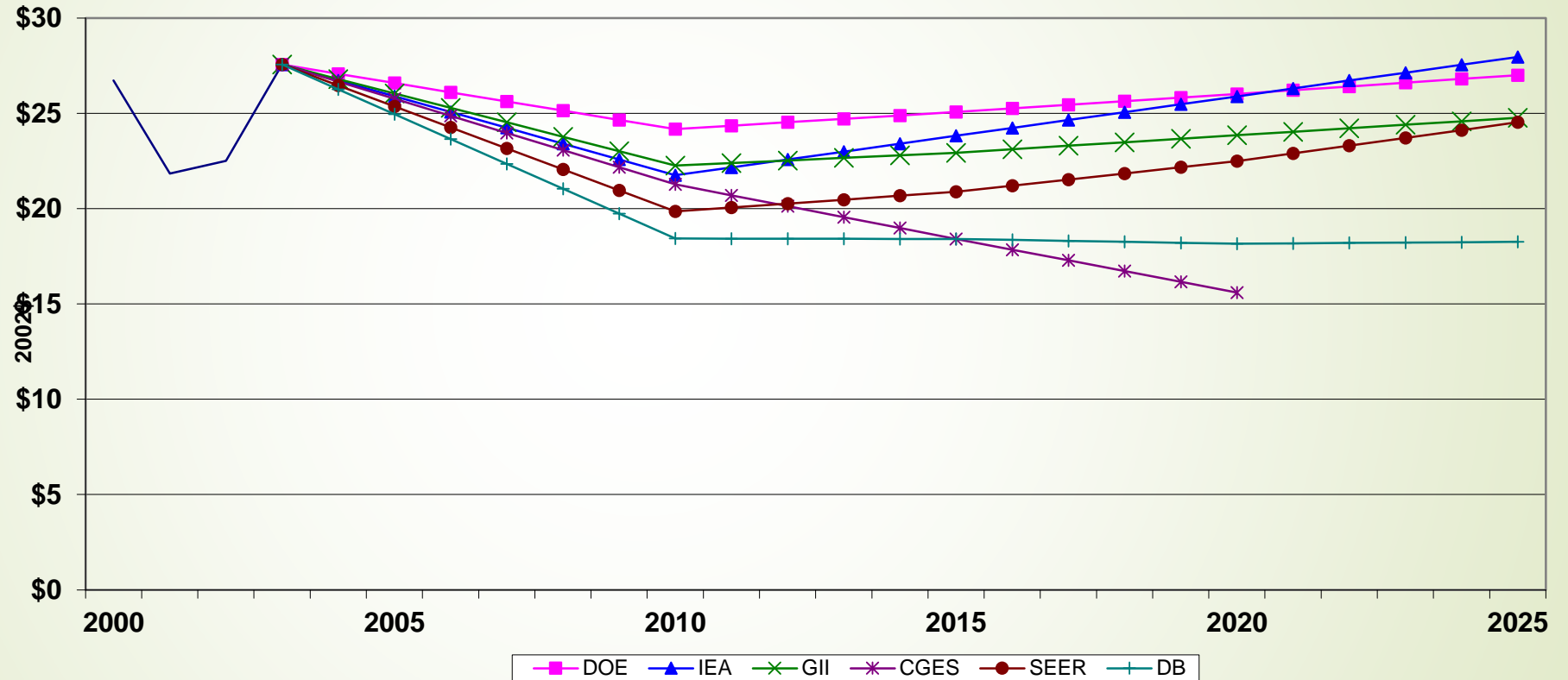
...IN HISTORICAL CONTEXT

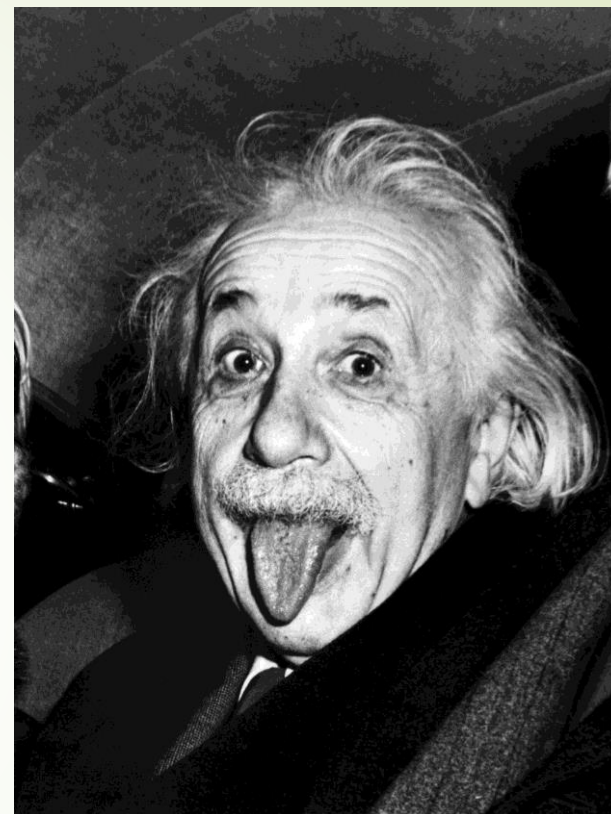
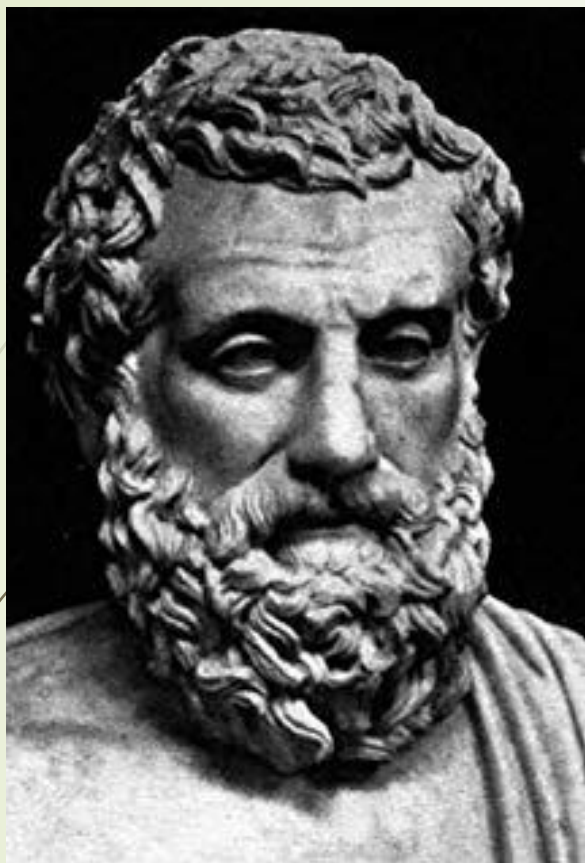


RECENT LONG-TERM PRICE FORECASTS



...THE SAME A DECADE EARLIER





THAT SAID....

55 views | Sep 15, 2006, 10:20pm

Really, Really Cheap Oil



Christopher Helman Forbes Staff
Energy



Gasoline for \$2? Michael Lynch says those good old days are just around the corner.

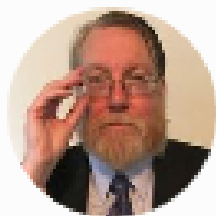


Don't sell that SUV just yet. Oil, at a recent \$66.50 a barrel, will fall to \$45 by mid-2007 and could dip briefly into the 20s in 2008. Sometime next year you are going to see a \$1.95 price on a gas pump.



15,940 views | Jun 15, 2017, 05:39am

How Two Nobel Prize-Winning Economists Got Oil Wrong

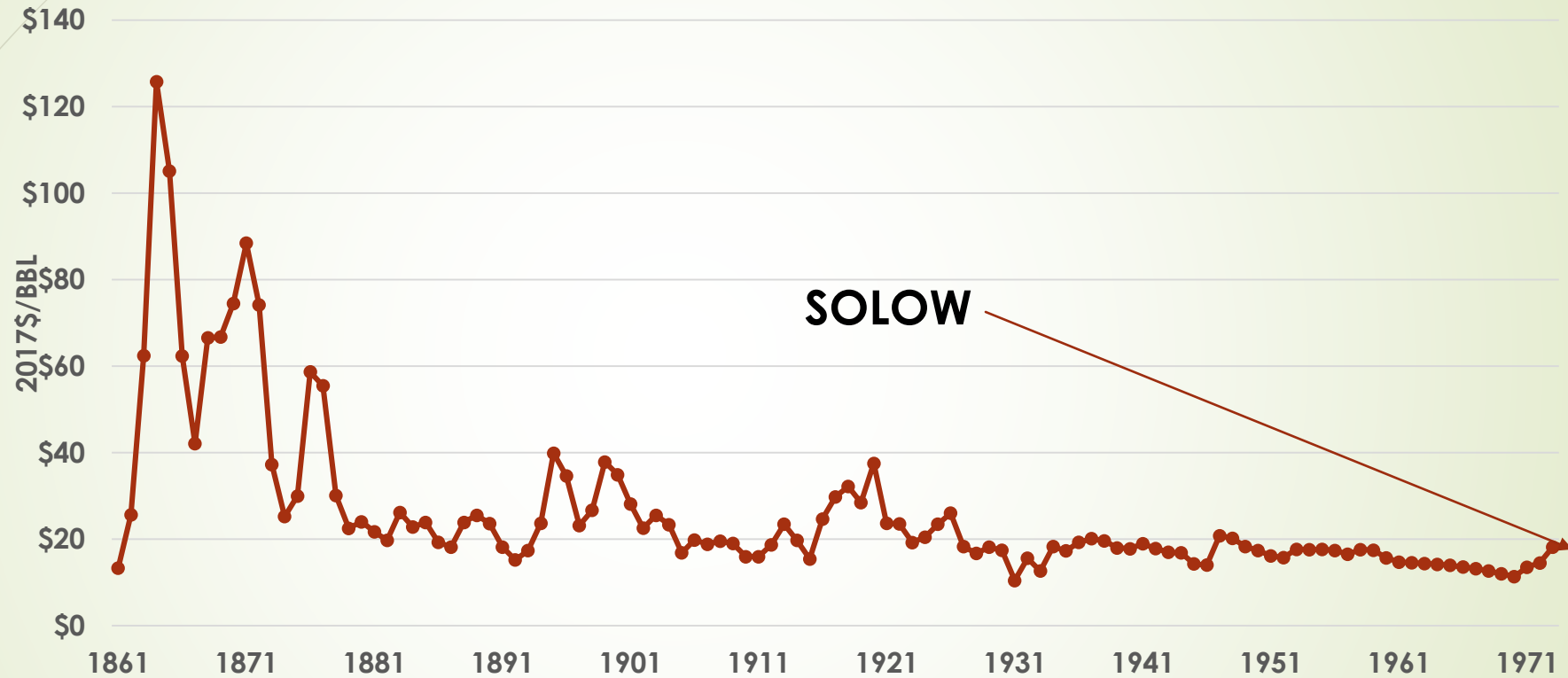


Michael Lynch Contributor ⓘ

Energy

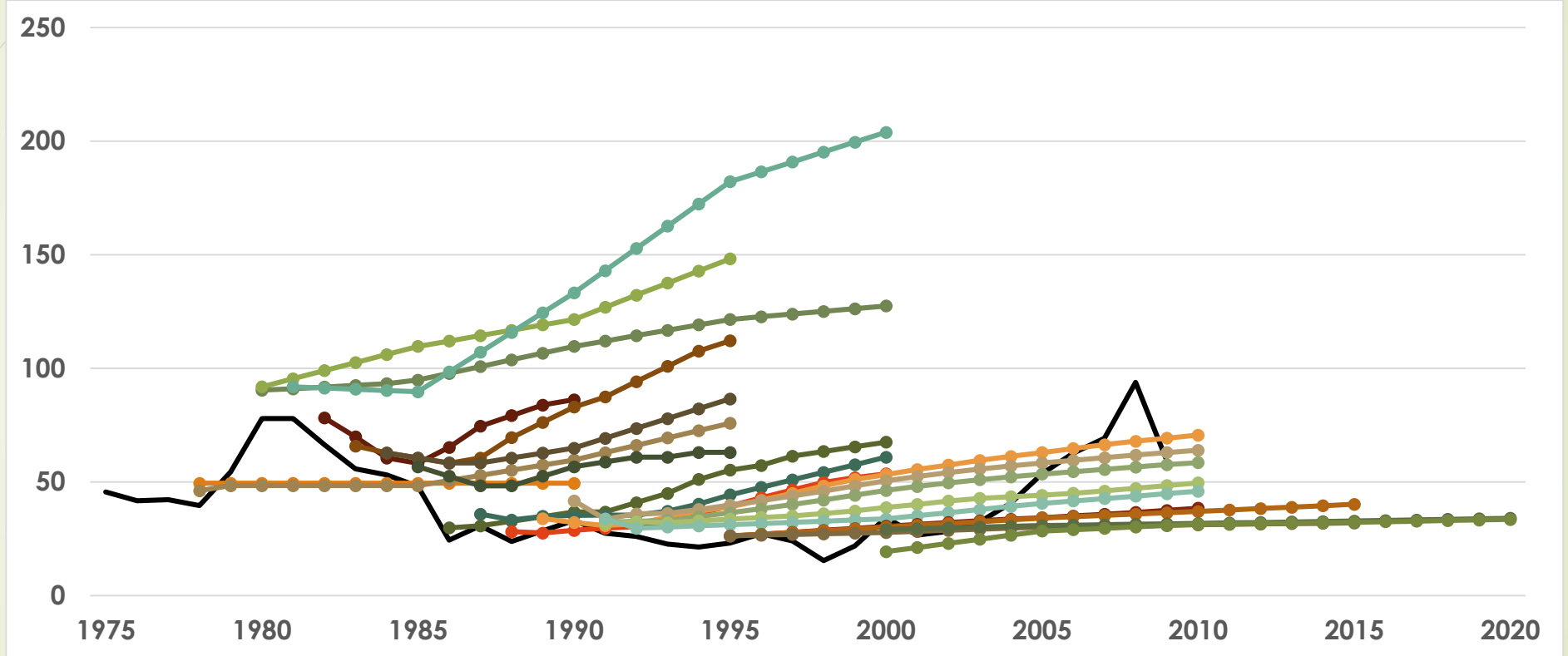
I analyze petroleum economics and energy policy.

SPOT THE EXPONENTIAL GROWTH!



WRONG LESSON LEARNED

(DOE PRICE FORECASTS OVER TIME)



KRUGMAN SPEAKS!

- ▶ “This tells us that the rise in oil prices isn’t the result of runaway speculation; it’s the result of fundamental factors, mainly the growing difficulty of finding oil and the rapid growth of emerging economies like China.” MAY 2008
PRICE \$125
- ▶ “the way ideas go from crazy stuff that only DFHs believe to stuff everyone knows, without ever going through a stage in which the holders of conventional wisdom acknowledge that they were wrong. Oh, and the people who were right are still considered DFHs; you see, they were right too soon. It looks as if peak oil may be going that way.” NYT APRIL 2008
(Production up 10 mb/d since)

BASIC LESSONS

- FORECASTERS ARE HUMAN
 - SUBJECT TO BIAS
 - BEARISH AND BULLISH
- ISSUES ARE COMPLEX
 - MUCH COMMENTARY SUPERFICIAL
 - \$100 IS THE FLOOR PRICE!
 - MANY COMMENTATORS NONEXPERT
 - EVEN NOBEL PRIZE WINNING ECONOMISTS

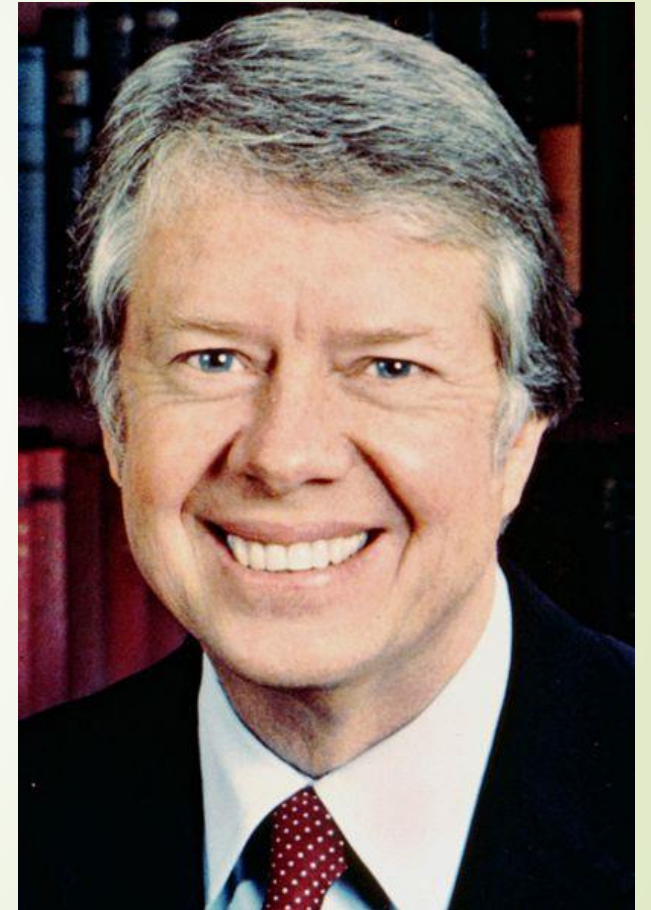
A PEAK OIL ARGUMENT



- ▶ “Steep falls in oil production means the world now needed to replace an amount of oil equivalent to Saudi Arabia’s oil production every two years....”
- ▶ Joe Romm webpage 2009/10

CAPTAIN MANHATTAN

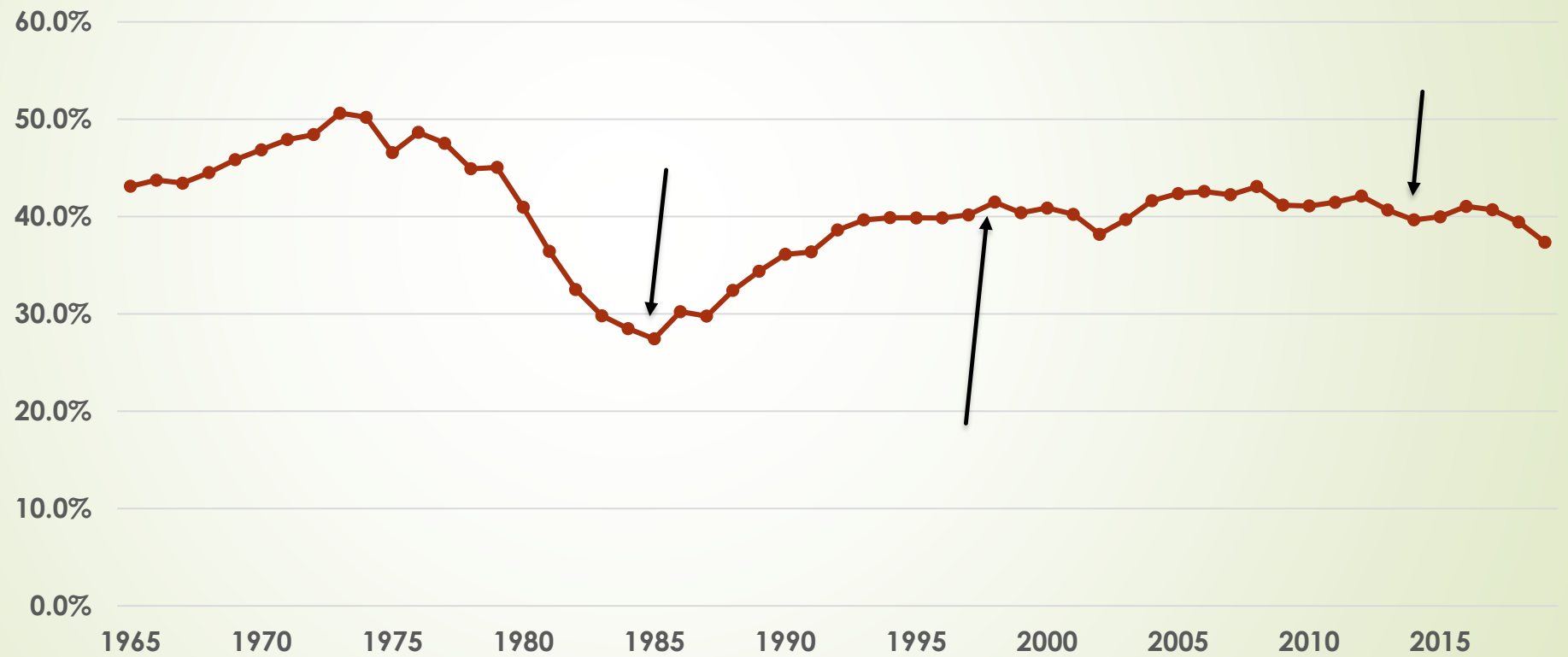
- "...that just to stay even we need the production of a new Texas every year, an Alaskan North Slope every nine months, or a new Saudi Arabia every three years. Obviously, this cannot continue." 1977 MEOW speech



BUT CAN WE DO BETTER?

- SOME CASE STUDIES
 - PRICE COLLAPSES 1986, 1998, 2014
 - PRICE SPIKES 1979/80, 2003-2014

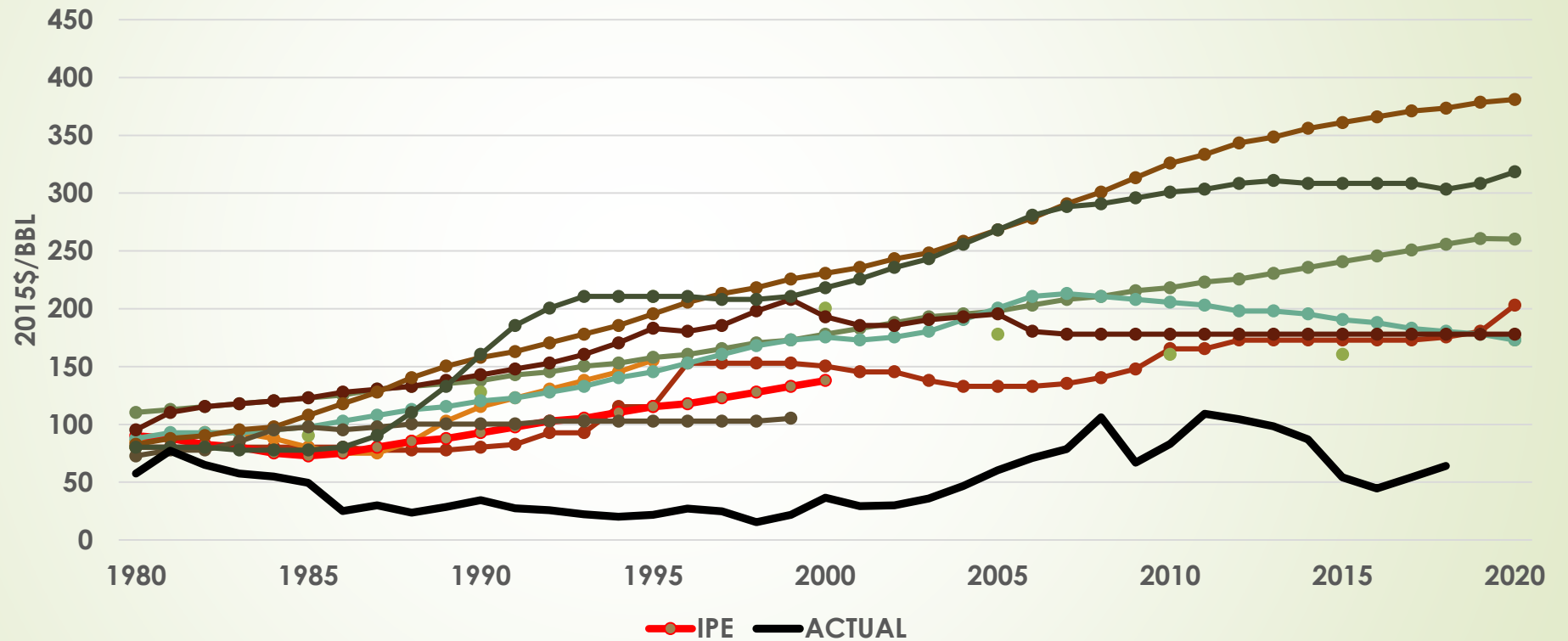
OPEC MARKET SHARE (AND PRICE CRASHES)



THE 1970S

- SOARING DEMAND FOR GULF OIL
- ARAB OIL EMBARGO 1973/74 AND PRODUCTION CUTS
- IRANIAN REVOLUTION (1979)
- IRAN/IRAQ WAR (1980-1988)
- INTERPRETATION:
 - WORLD OIL PRODUCTION HAS PEAKED
 - RESOURCES INADEQUATE TO MEET DEMAND

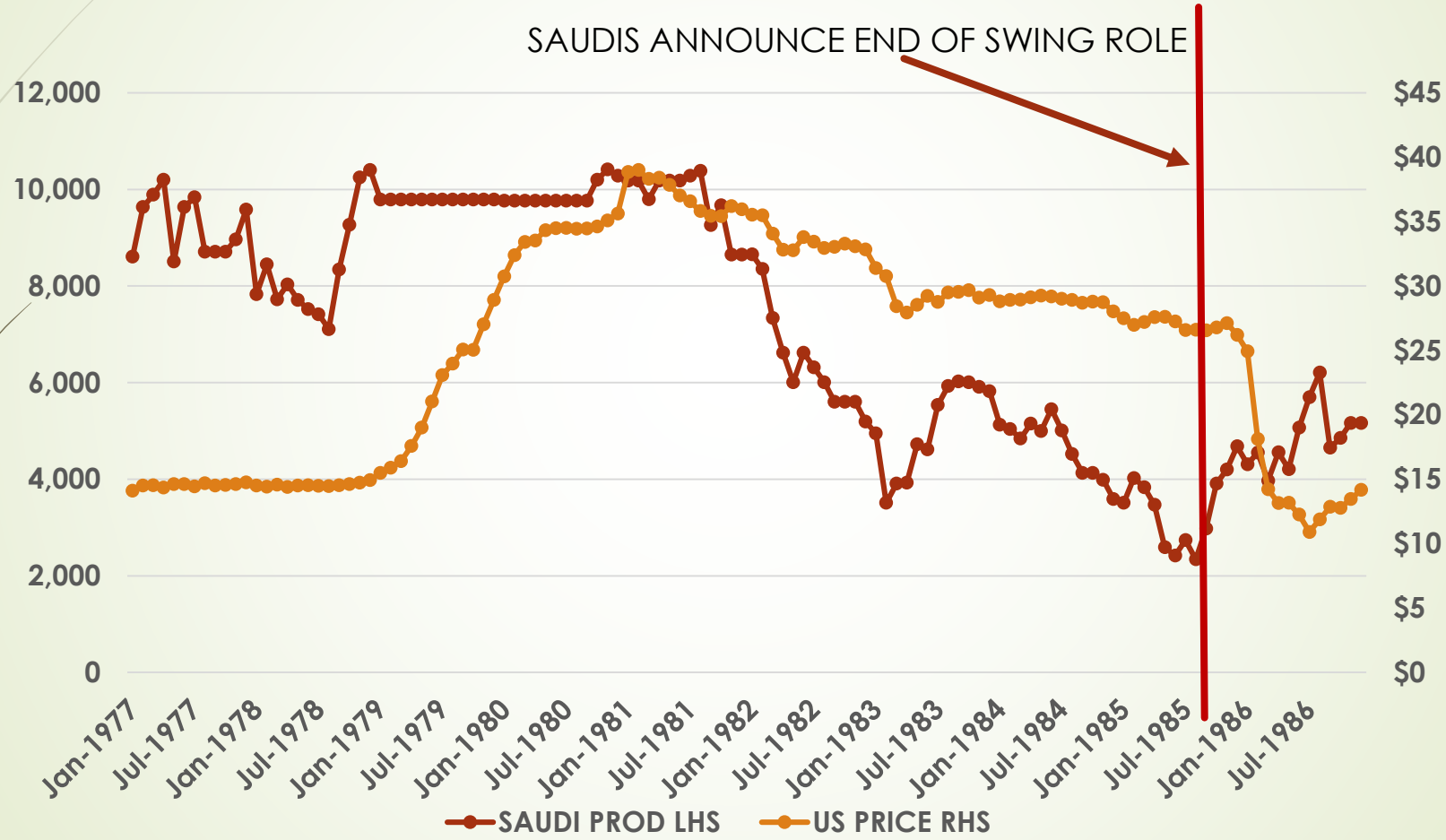
1980 FORECASTS (STANFORD)



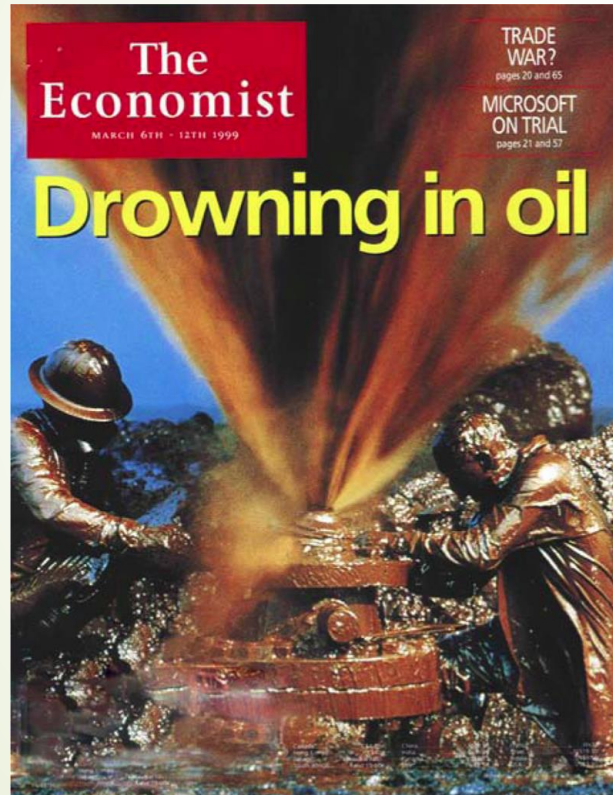
THE VIEW FROM 1985

- PRICES TO SOON 'RECOVER'
- PRICE DOESN'T MATTER
 - DEMAND DOWN BECAUSE OF RECESSION
 - DEMAND RECOVERY IMMINENT
- NON-OPEC HAS PEAKED
 - NON-GULF PEAKED, EXCEPT MEXICO
 - OPEC MULTIPLIER
 - (SEE ADELMAN)
- COSTS SO HIGH, PRICES MUST RISE
 - *"Two experts...calculated that the daily capital cost per barrel of new production outside OPEC jumped from \$3,000 to \$70,000 between 1963 and 1982." (1985)*

SAUDI EXPORTS COLLAPSING



1998 OIL PRICE SHOCK

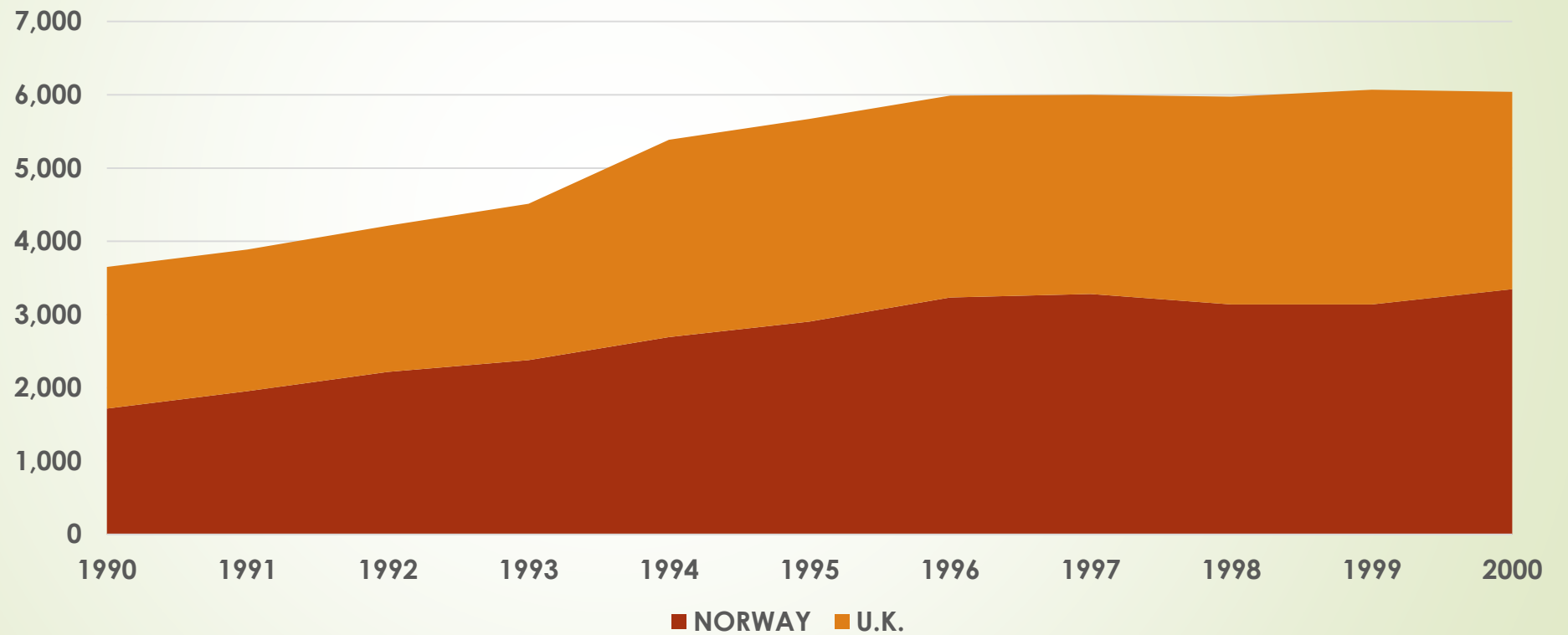


- BOOMING PRODUCTION AND/OR INVESTMENT
 - NORTH SEA
 - OIL SANDS
 - ORINOCO
 - G-T-L
- ALL PROFITABLE AT \$20!

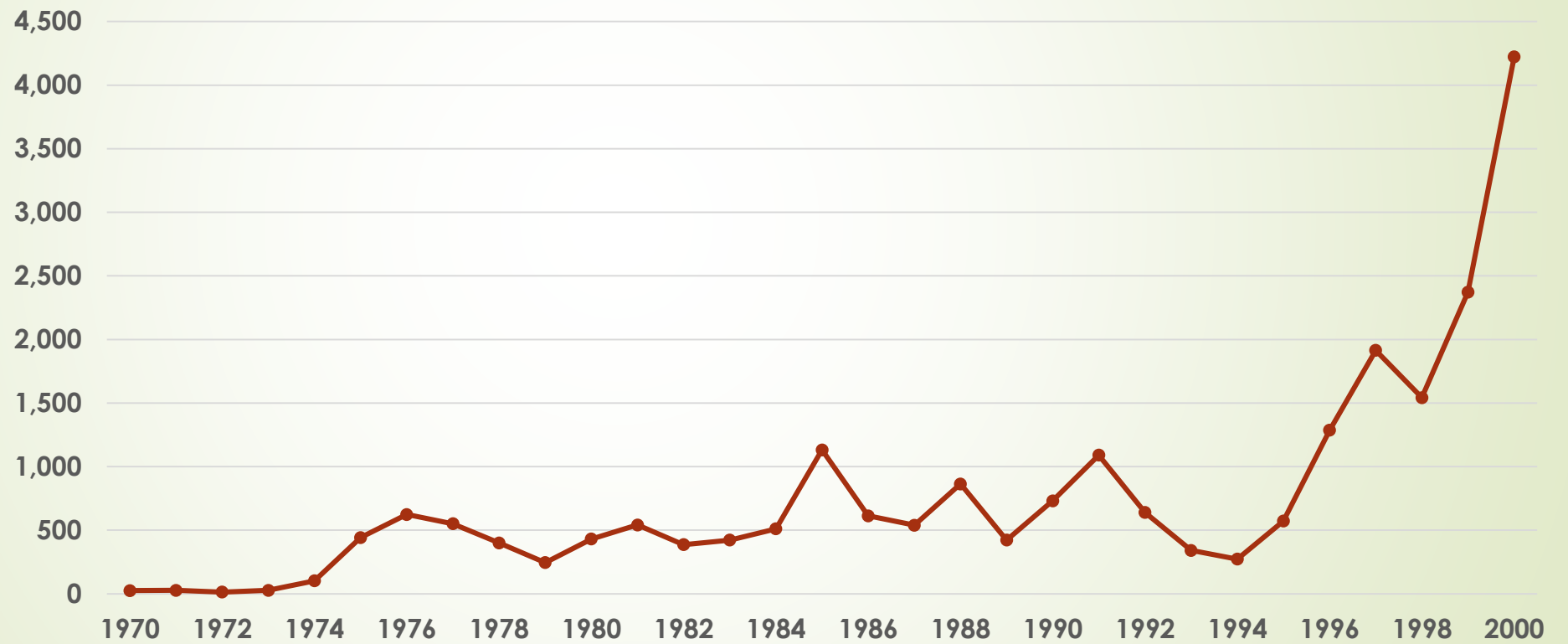
COLLAPSE FROM LOW PRICE, NOT HIGH



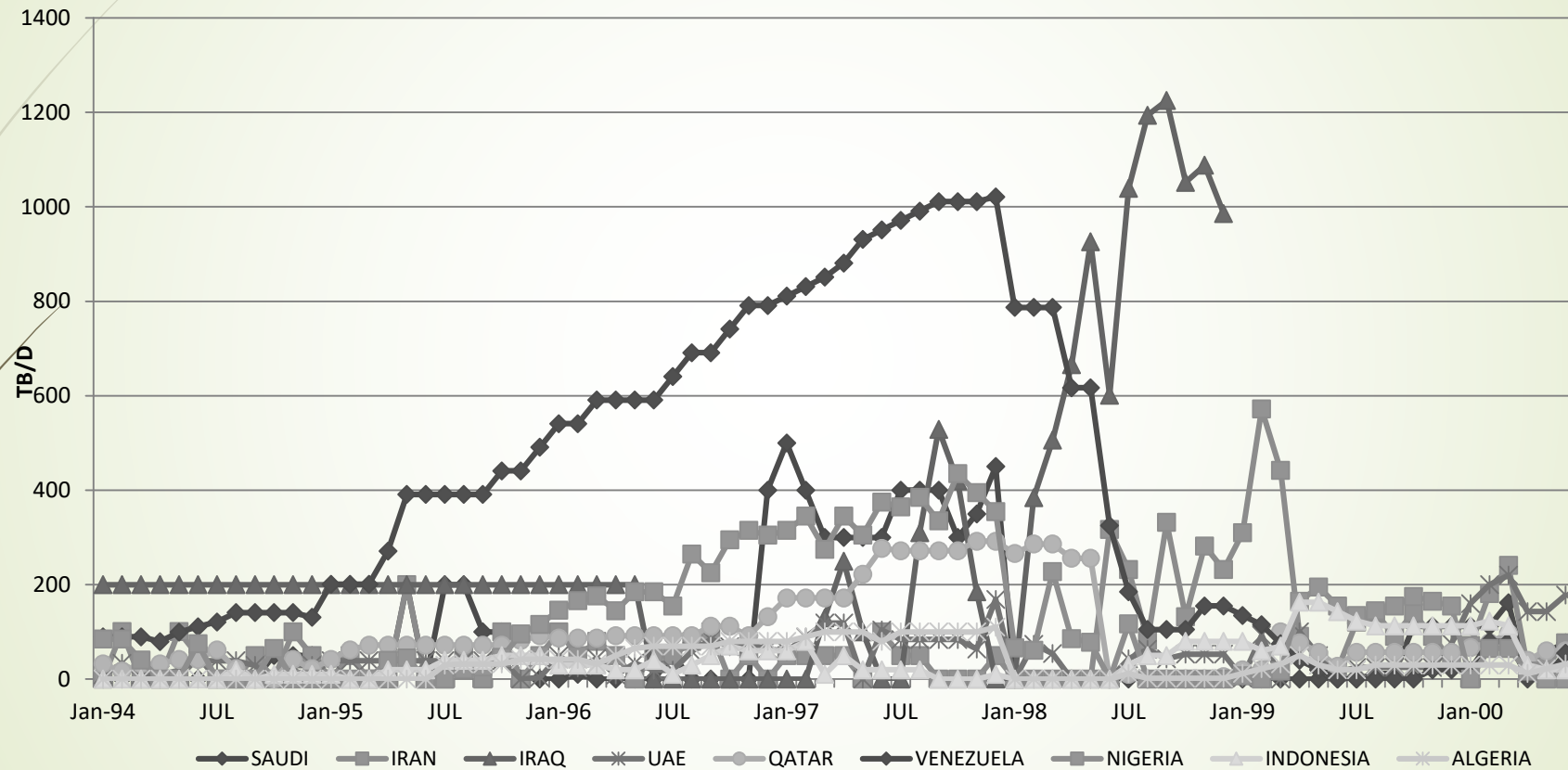
NORTH SEA BOOMING



OIL SANDS INVESTMENTS



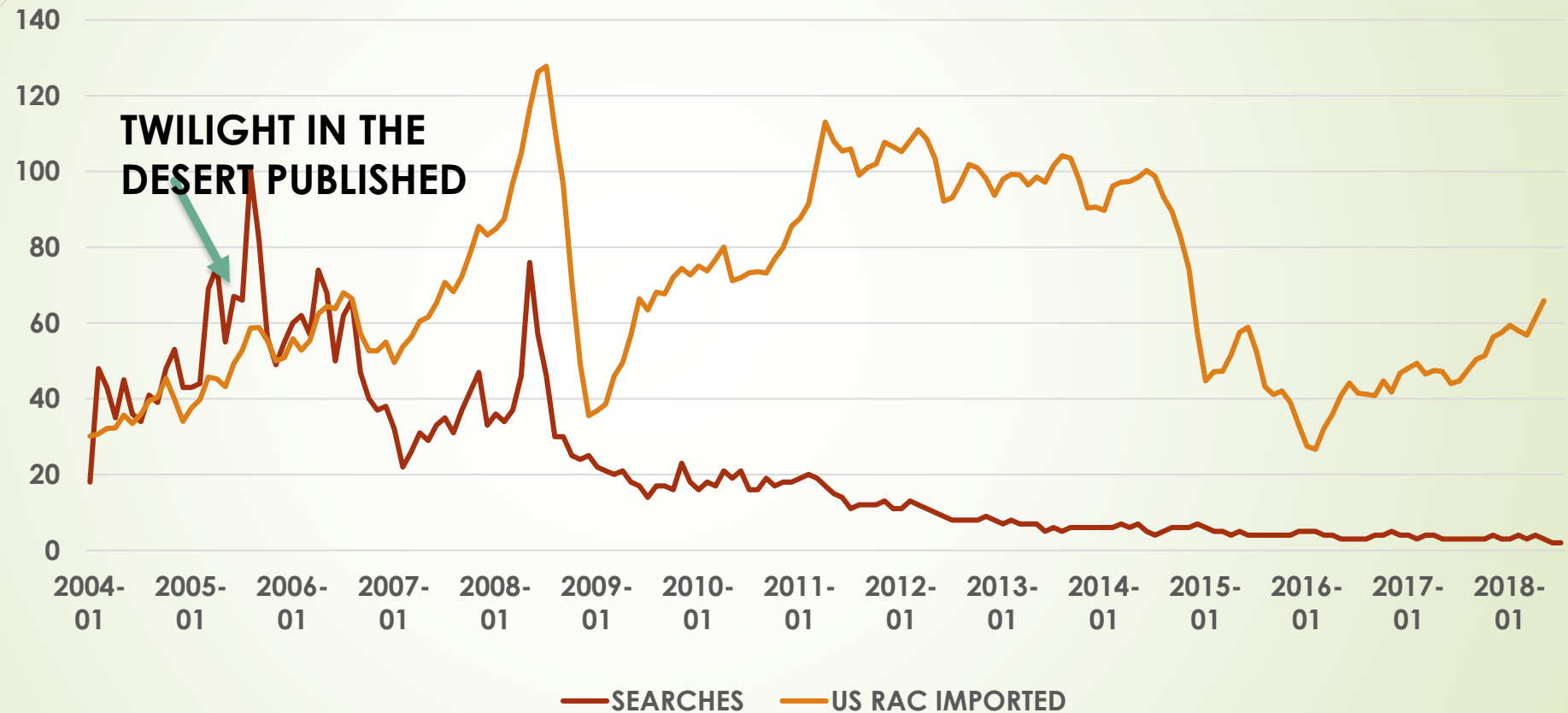
Non-compliance in 1998



IF IT WALKS LIKE A DUCK...



PEAK OIL MENTIONS ON GOOGLE

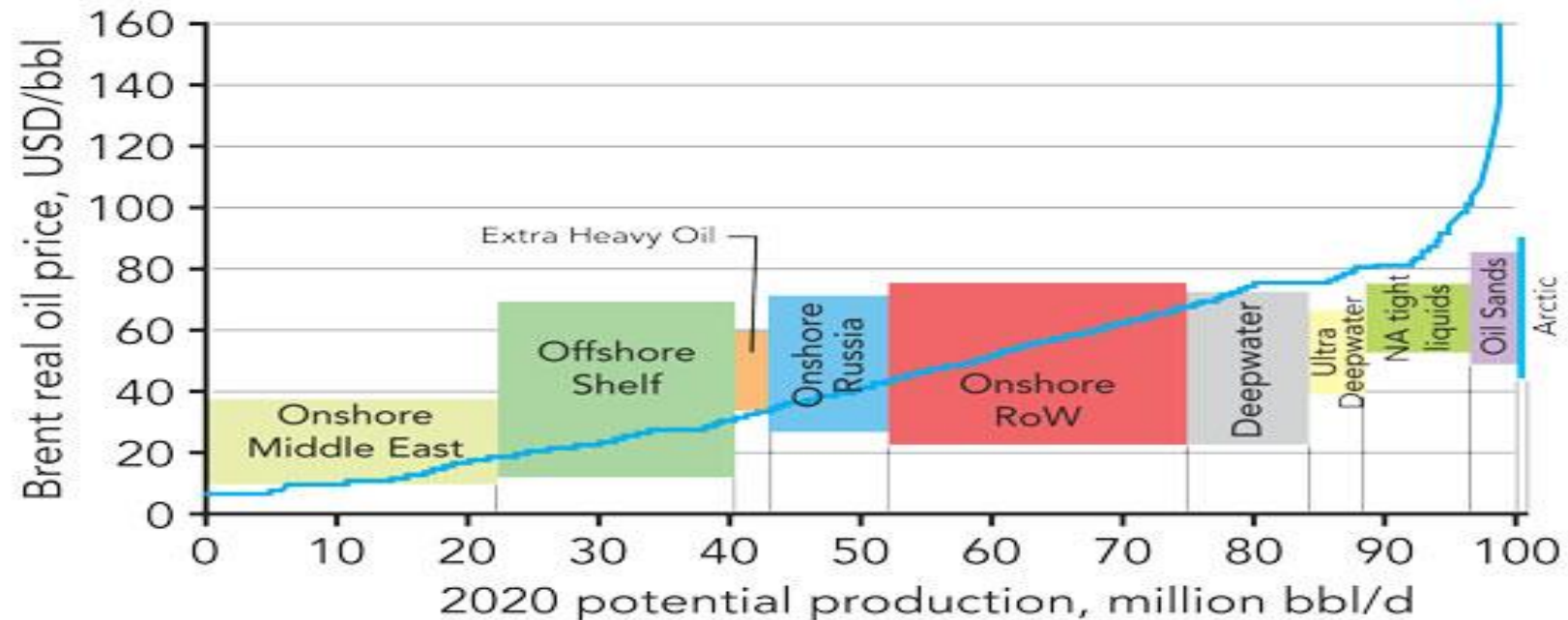


PRICE SPIKE 2003-2014

- MASSIVE, LENGTHY SUPPLY DISRUPTIONS
 - 2002 VENEZUELAN STRIKE
 - 2003 GULF WAR II
 - 2005 KATRINA
 - 2011 ARAB SPRING
- JUST LIKE 1970S, INTERPRETED AS RESOURCE SCARCITY
 - FOCUS WAS ON PEAK OIL
 - HIGHER COSTS: \$100 THE NEW FLOOR
- 2008 WAS A BUBBLE
 - EXCEPT FOR *THE ECONOMIST*

COSTS SETTING THE PRICE FLOOR?

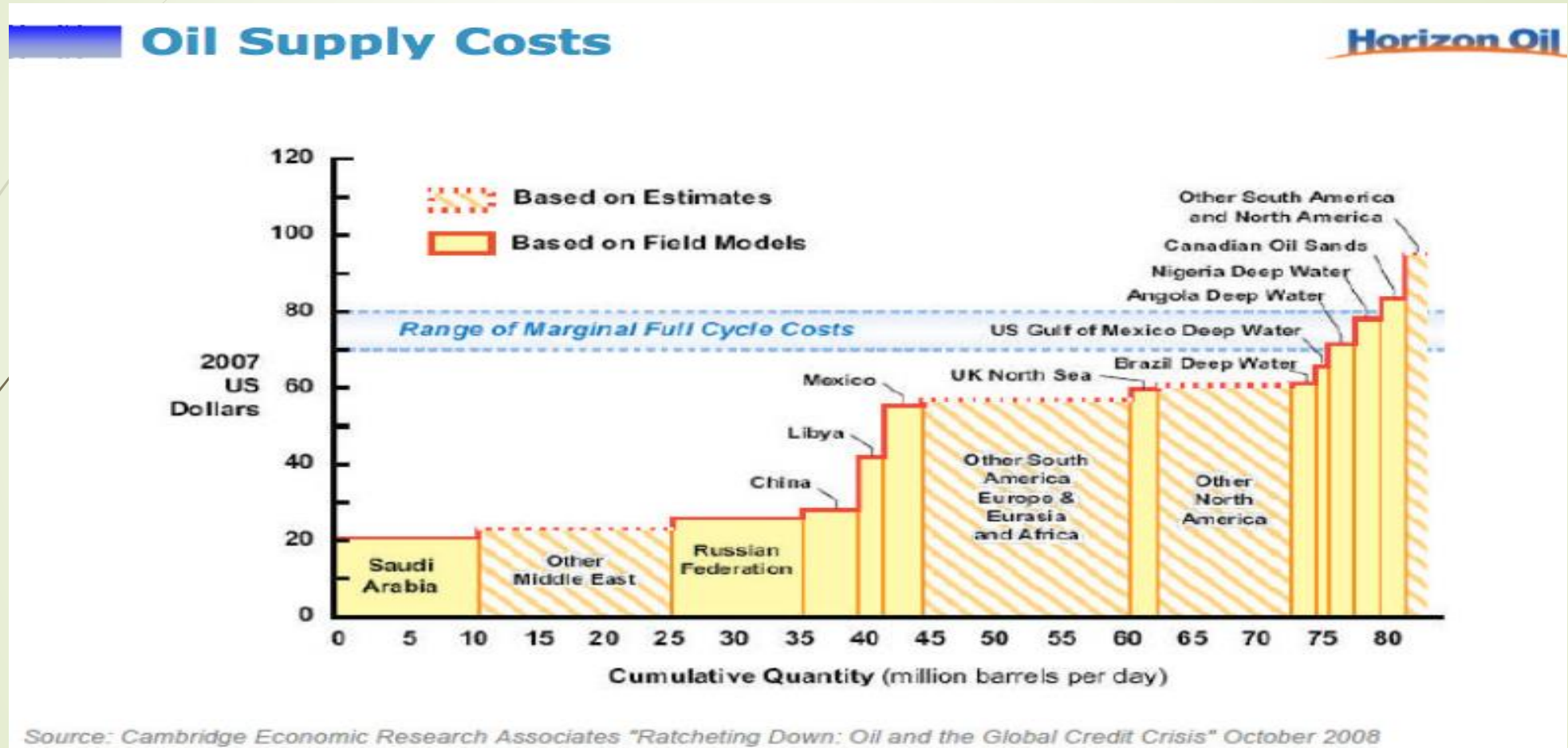
Fig. 6: COST OF SUPPLY CURVE FOR GLOBAL OIL 2020



Note: Future oil prices will be determined by marginal cost of developing new oil rather than OPEC interventions. North American shale will out-compete many oil sands and arctic oil projects.

Source: UCube by Rystad Energy

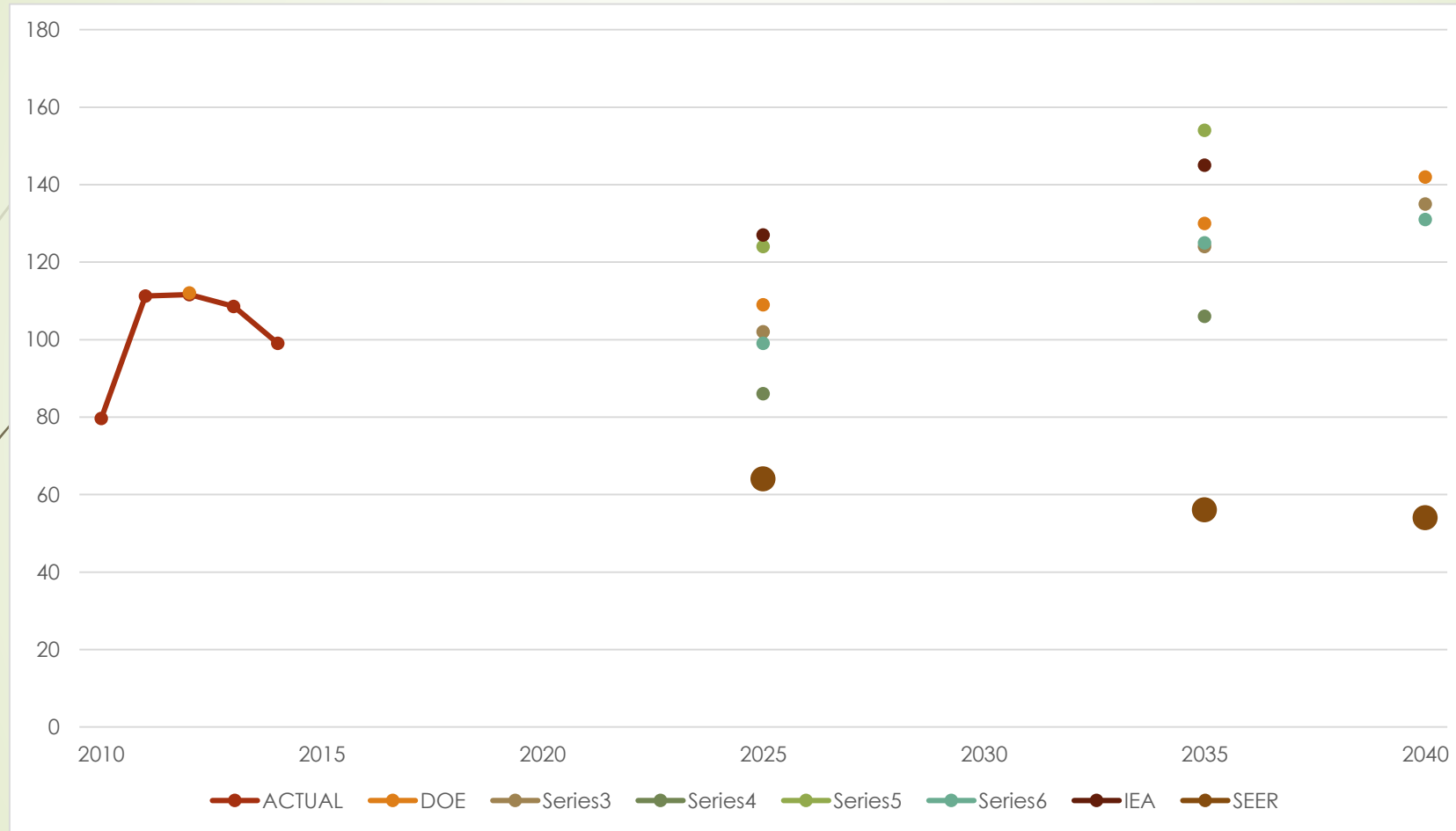
SUSPICIOUS INCREASE



THE 2014 'SURPRISE'

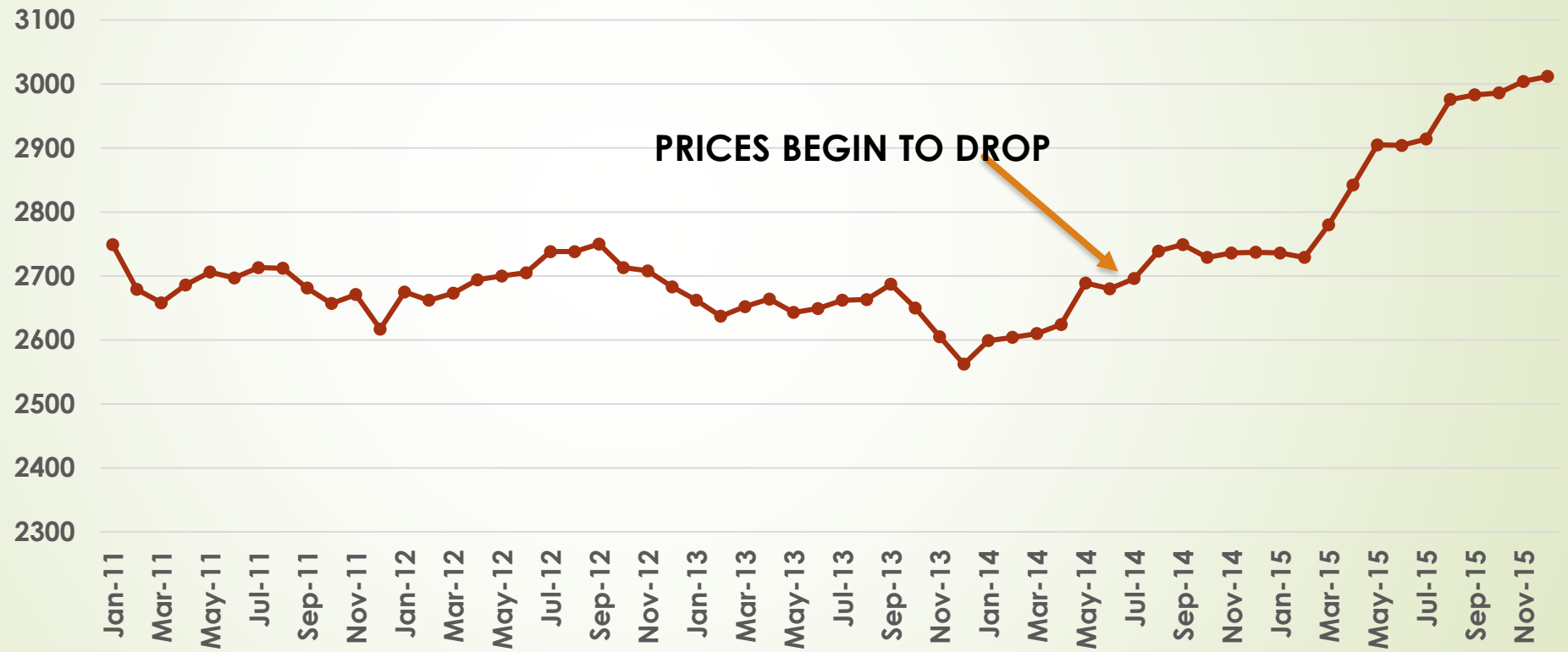
- \$100 WAS THE NEW FLOOR PRICE
 - NEAR-COMPLETE CONSENSUS
- FUNDAMENTALS APPARENTLY STRONG
- OPEC WAS THE DOG THAT DIDN'T BARK

DOE 2014 PRICE SURVEY

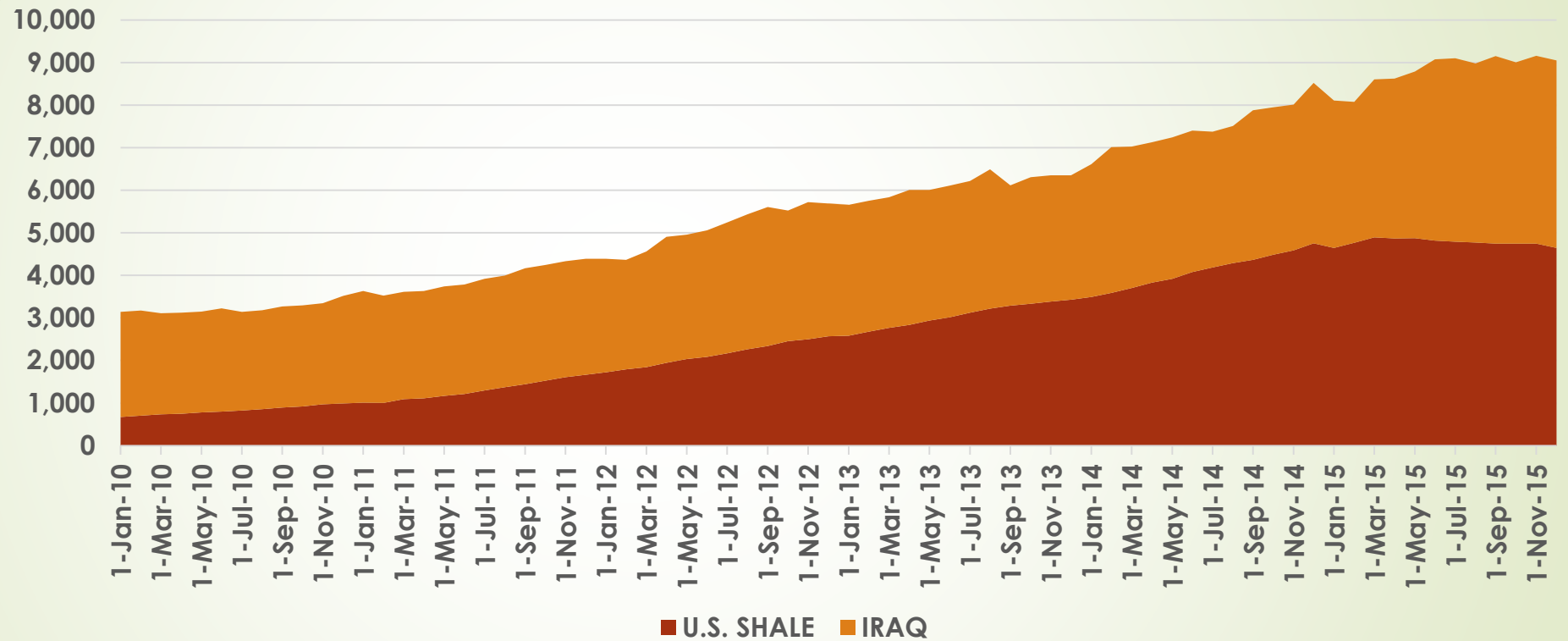


OECD INVENTORIES

(ROSE AFTER PRICES DROPPED)



BOOMING SUPPLY, THREAT OF



SOME BASICS

- SHORT TERM PRICES UNPREDICTABLE
 - OPEC POLICIES
 - SUPPLY DISRUPTIONS
 - WEATHER, GDP, TRADER PSYCHOLOGY
- LONG-TERM PRICES MORE PREDICTABLE
 - SUPPLY AND DEMAND
 - TAXES, ETC., CAN AFFECT DEMAND, ARE UNPREDICTABLE
 - SUPPLY BASIC: “Diminishing returns are opposed by increasing knowledge, both of the earth’s crust and of methods of extraction and use. The price of oil, like that of any mineral, is the uncertain fluctuating result of the conflict.” Adelman, (1986)
 - BUT: RESOURCE NATIONALISM

THE FUTURE

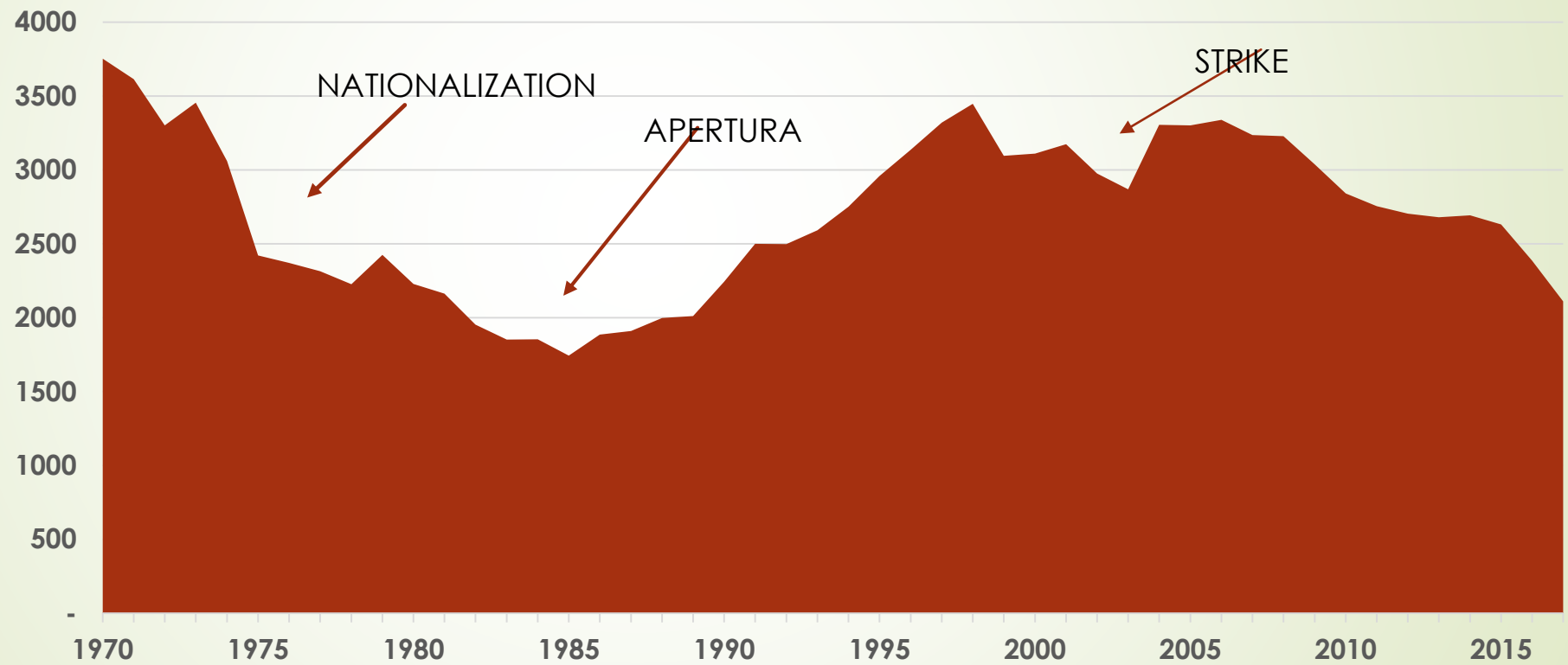
- ...IS UNCERTAIN
 - J P MORGAN ASKED WHAT THE MARKET WILL DO, SAID "IT WILL FLUCTUATE"
- LONG TERM DRIVEN BY FUNDAMENTALS, POLITICS AND TECHNOLOGY
- DEMAND: TAXES, ECONOMIC GROWTH, CLIMATE CHANGE POLICIES
- SUPPLY: RESOURCE NATIONALISM, ENVIRONMENTALISM (NIMBYISM)

RESOURCE NATIONALISM



IS CYCLICAL OR AT LEAST FLUCTUATES

VENEZUELAN PRODUCTION UNDER DIFFERENT POLITICAL CIRCUMSTANCES



LESSONS OF HISTORY

- CONSENSUS DOESN'T IMPLY ACCURACY OR VALIDITY
 - HOTELLING, HUBBERT CURVES
- SINCE 1980, NEARLY EVERY PRICE FORECAST CALLED FOR HIGHER LONG-TERM PRICES
 - EVEN AFTER PRICE SPIKES
- PRODUCTION FORECASTS TEND TO BE PESSIMISTIC
 - NON-MIDDLE EAST PEAK FORECASTED SINCE EARLY 1980S
 - FAILURE TO DIFFERENTIATE IMPACT OF POLITICS (VENEZUELA, IRAN) FROM GEOLOGY

ULTIMATE TAKE-AWAYS

- BE OPEN-MINDED!
 - NOBODY'S PERFECT
 - THE IMPOSSIBLE HAS OFTEN HAPPENED
- CONVENTIONAL WISDOM OFTEN UNWISE
- SUPERFICIAL KNOWLEDGE IS JUST THAT
 - ESCHEW CLICHES
- DIFFERENTIATE BETWEEN SHORT-TERM EVENTS AND LONG-TERM TRENDS

PRICE DRIVERS

- LOW PRICES: \$50 OR LESS
 - HIGH CARBON TAXES (MAYBE)
 - HEAVY ELECTRIC VEHICLE MARKET SHARE (NOT SOON)
 - LOW RESOURCE NATIONALISM (VEN, MEX, IRAN, IRAQ)
 - POSSIBLE
- HIGH PRICES: \$70 OR MORE
 - STRONG ECONOMIC GROWTH (MAYBE)
 - HIGH RESOURCE NATIONALISM (MAYBE)
 - INCLUDES NIMBYISM AND SOCIALISM

ARE YOU SMARTER THAN A ROMAN?



Clodius Publius and the Sacred Chickens

HISTORY LESSON

- ▶ In ancient times, it was assumed the gods knew everything and predicting the future was done by questioning them through various means. The Romans would offer grain to sacred chickens and ask a question: if they ate the grain, the answer was positive, if they refused, negative.
- ▶ Clodius Publius, a Roman Consul during the second Punic War, was about to set sail to attack Carthage. The sacred chickens were brought on board and consulted as to the success of his mission. They didn't eat the grain. Incensed, he famously said, "If they won't eat, they can drink," and drowned them in the Mediterranean.
- ▶ His fleet was later destroyed by a storm.
- ▶ The lessons: Don't let your biases overrule your forecaster.
- ▶ And...

DON'T PAY YOUR
FORECASTER IN CHICKEN
FEED!