APERC Annual Conference

The macro environment and impact on oil investments

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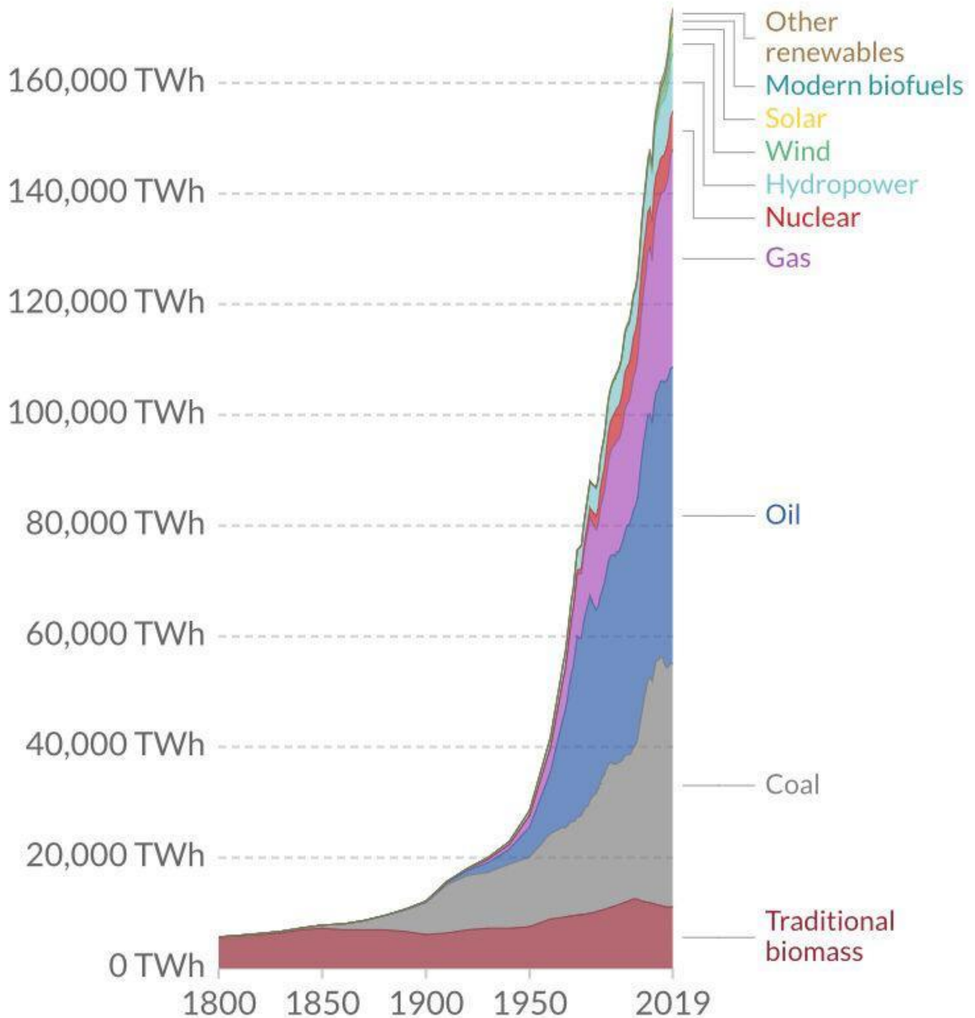
Global Energy Consumption
More energy, transition or both?

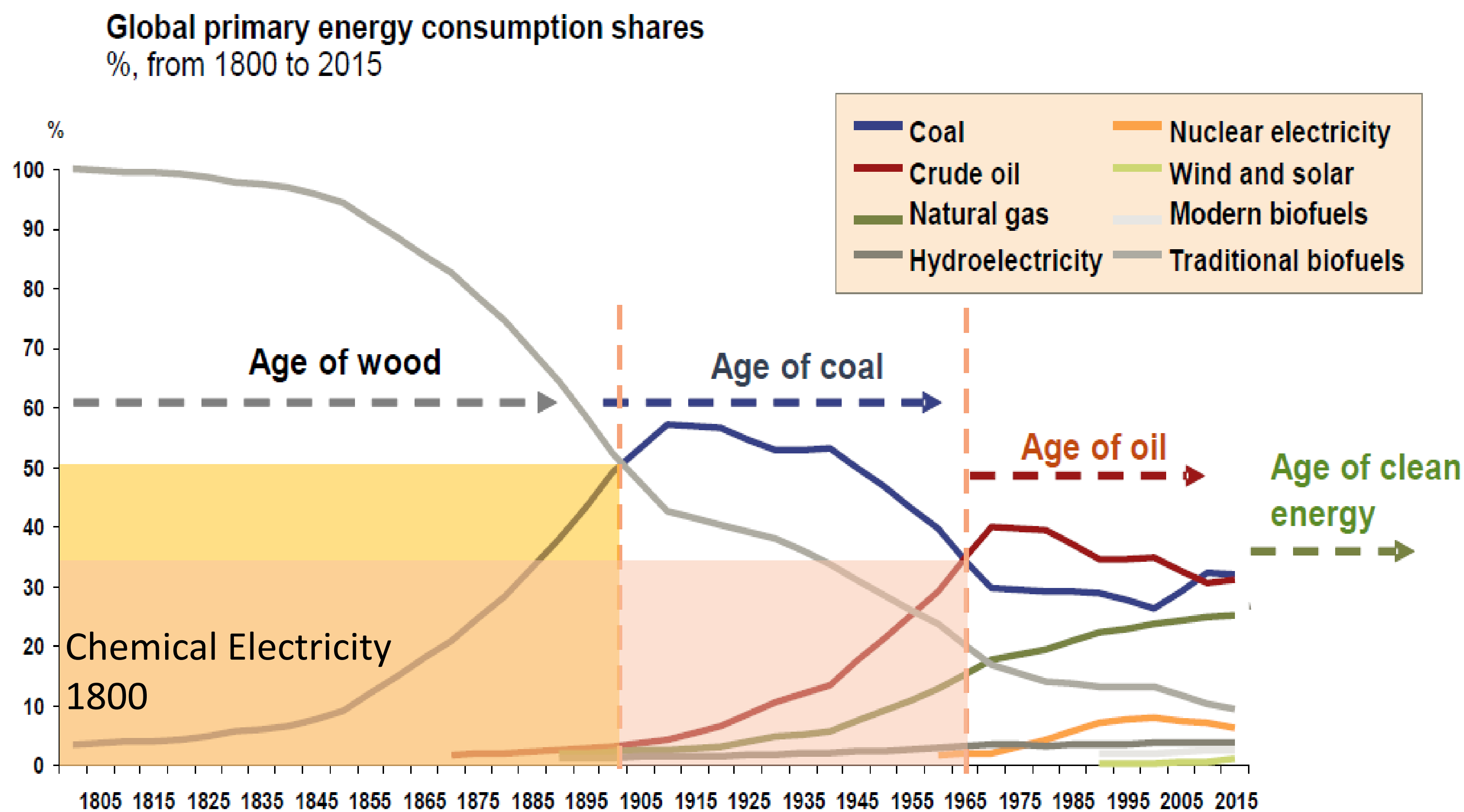
- Population growth, economic growth, wealth, convenience, affordability, availability drives primary energy demand
- For a long time, humans have been transforming different energy sources. We have never stopped using one
- Energy sources with high energy density are critical for society and our economic system
- Technology and human imagination unlocks energy sources, addresses challenges



Source: Vaclav Smil (2017) & BP Statistical Review of World Energy
OurWorldInData.org/energy • CC BY

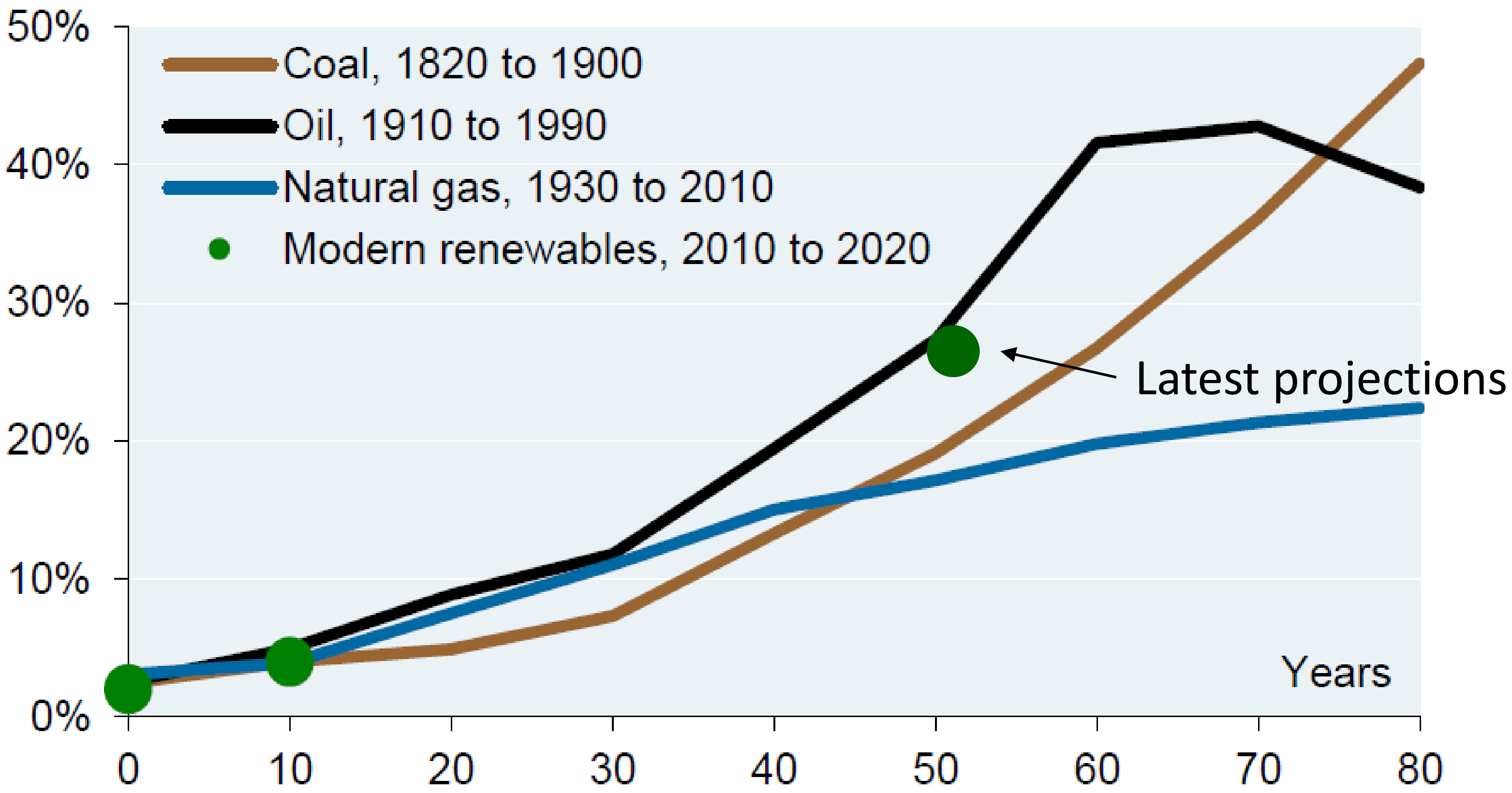
Technological Revolutions and Transformation of the Energy System

Fire, wood - 1000s of years **Coal - 3500 BC** **Windmills - 9 AD**



Source: ASD, JPM

Transformations Never End, Energy Transitions Takes Time



Source: JP Morgan Energy Report

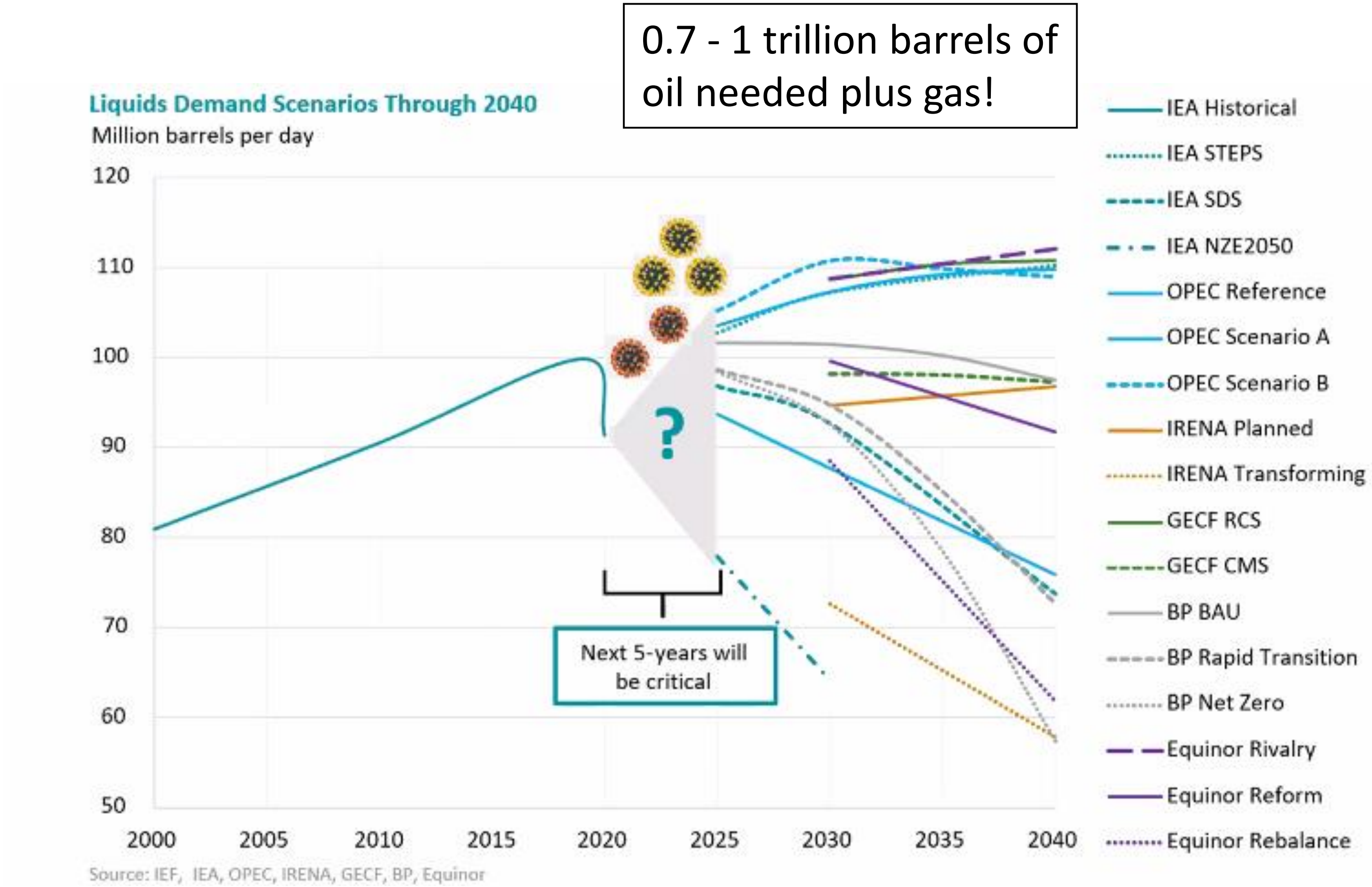
Macro Environment
What Some are Saying, Advocating

- No more oil and gas investments needed in exploration
- Oil and gas resources will stay underground
- Phase out coal, nuclear is useful but not needed
- Incredible rise in electric cars and batteries around the corner
- Renewables are not a problem for climate change, net zero
- A new technology surfaces every day
- Decarbonize the supply side (you hear less about the demand side)
- Reducing energy poverty and renewables are not incompatible

- ….Energy Security has been comprised after Russian invasion of Ukraine. Let's revise what we have.

Source: Bloomberg, IEA Reports, Various Sources

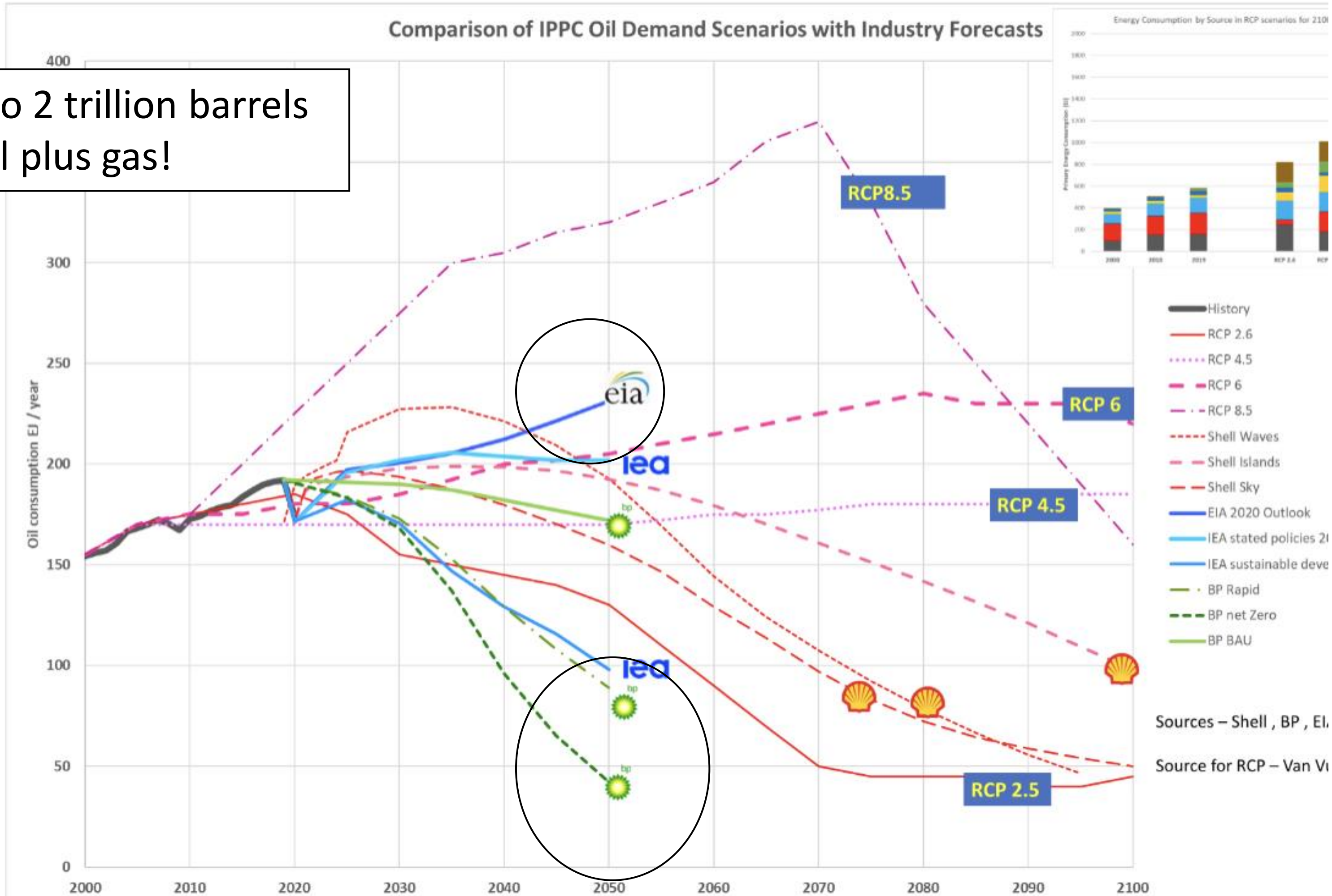
Global Oil Uncertainty: Implications



Source: IEF

Global Oil Uncertainty: Implications

1.5 to 2 trillion barrels of oil plus gas!

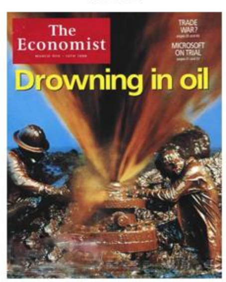


Source: IPCC, Various, EIA, IEA, Shell, BP

Some Lessons from Forecasting (in Oil)

- Consensus does not imply accuracy or validity
- Conventional wisdom is often unwise
- Failure to differentiate short term events vs long term trends is a common failure
- Resources and supply has been underestimated many times for natural resources
- Renewable's growth have been over estimated

1999



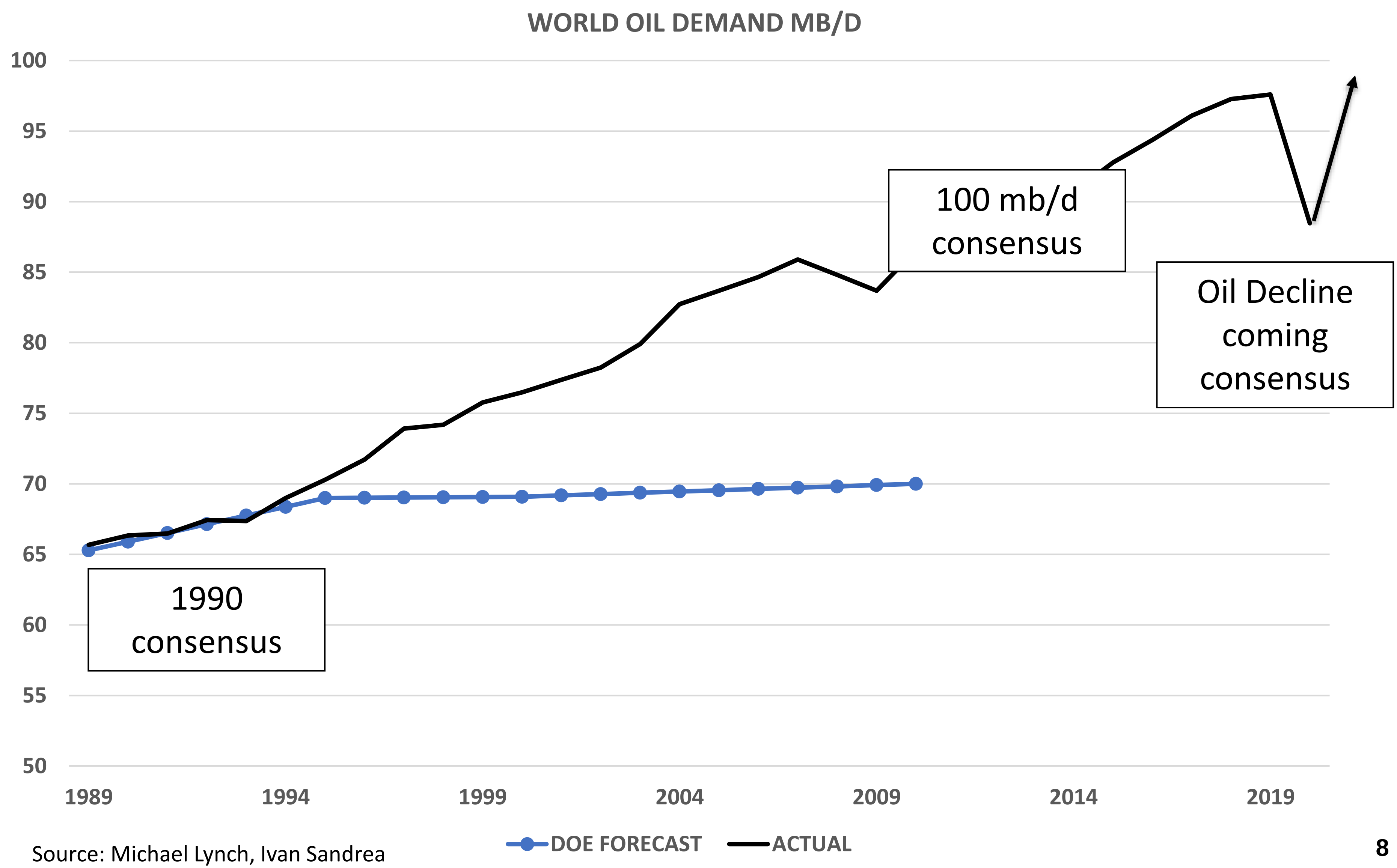
2003

2017

2020

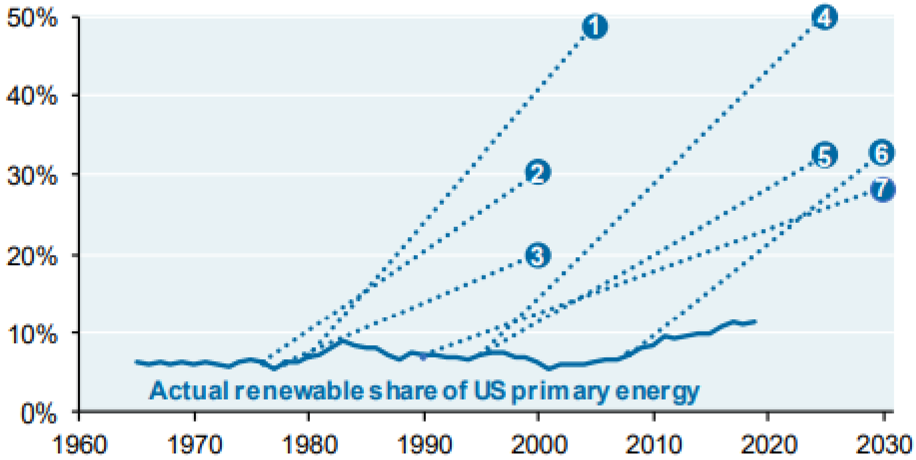
Source: Michael Lynch, Ivan Sandrea

Oil Demand has been Underestimated Before



Source: Michael Lynch, Ivan Sandrea

A Rapid Increase in Renewables has been Overestimated Before



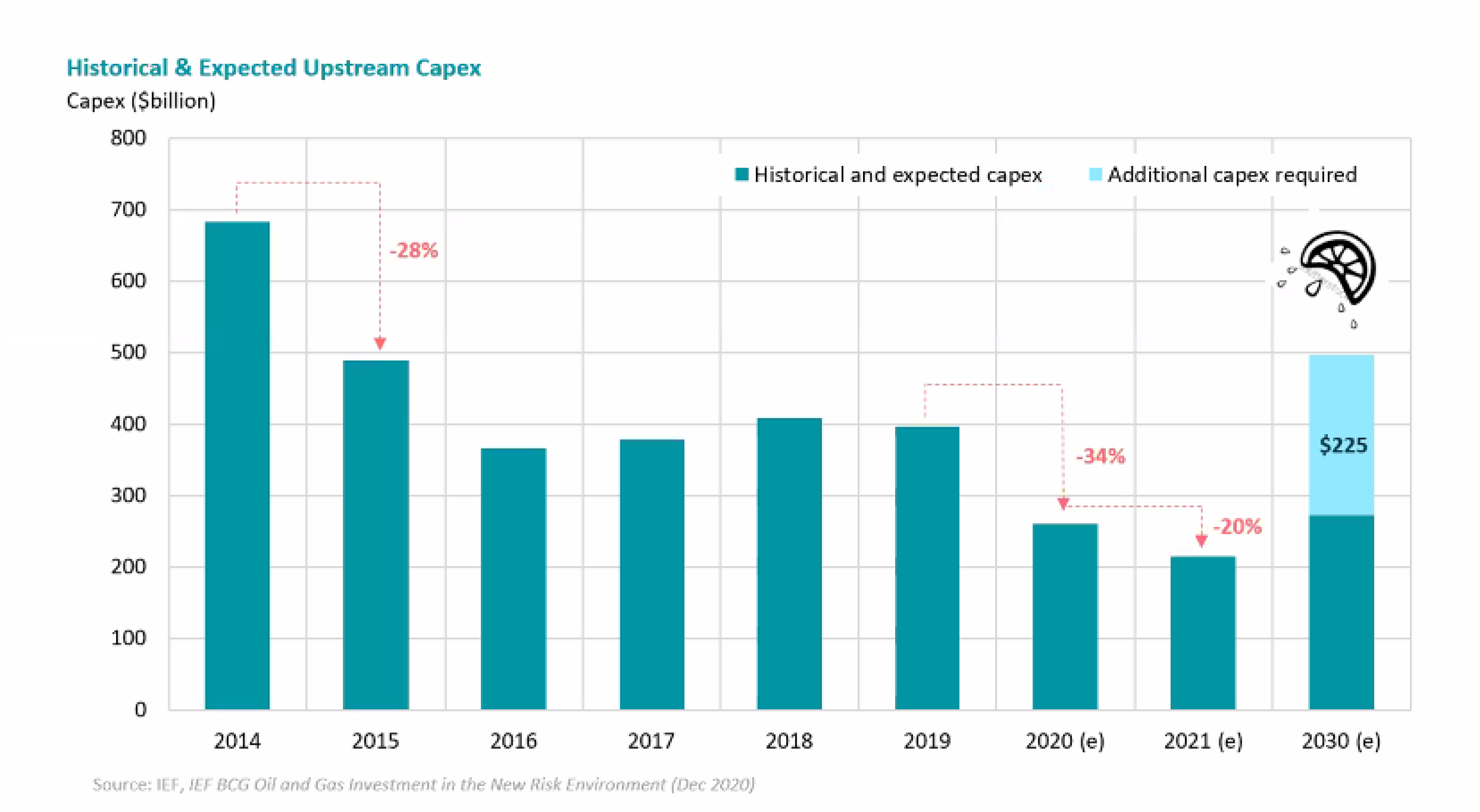
Source: EIA, listed authors, Vaclav Smil, JPMAM. 2019. Renewables include wind, solar, hydropower, geothermal, biomass, wood and waste.

1. Physicist Bent Sorensen
2. Amory Lovins, Rocky Mountain Institute
3. Carter Administration (solar only)
4. Clinton Presidential Advisory Panel
5. Intergovernmental Panel on Climate Change
6. Google 2030 Clean Energy Plan
7. National Renewable Energy Laboratory

In 2020, Mark Jacobson (Stanford) forecast 80% by 2030

Source: JP Morgan Energy Report

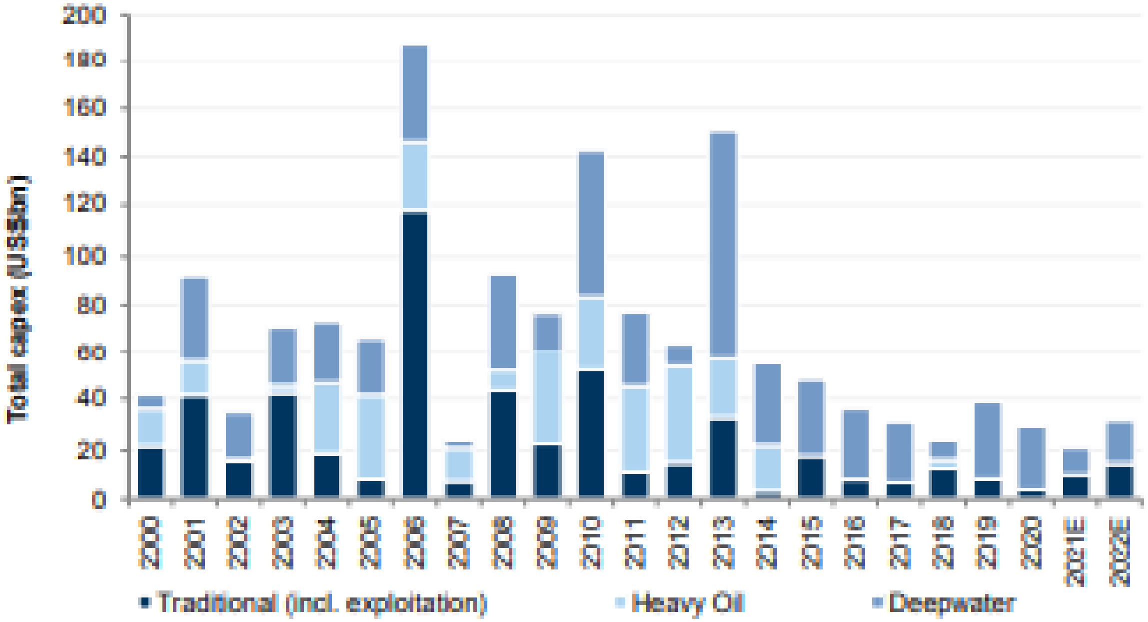
Global Oil/Gas: industry capex is too low



Source: IEF

Global Oil: industry capex is too low

Top Projects capex sanctioned in oil by year, split by winzone

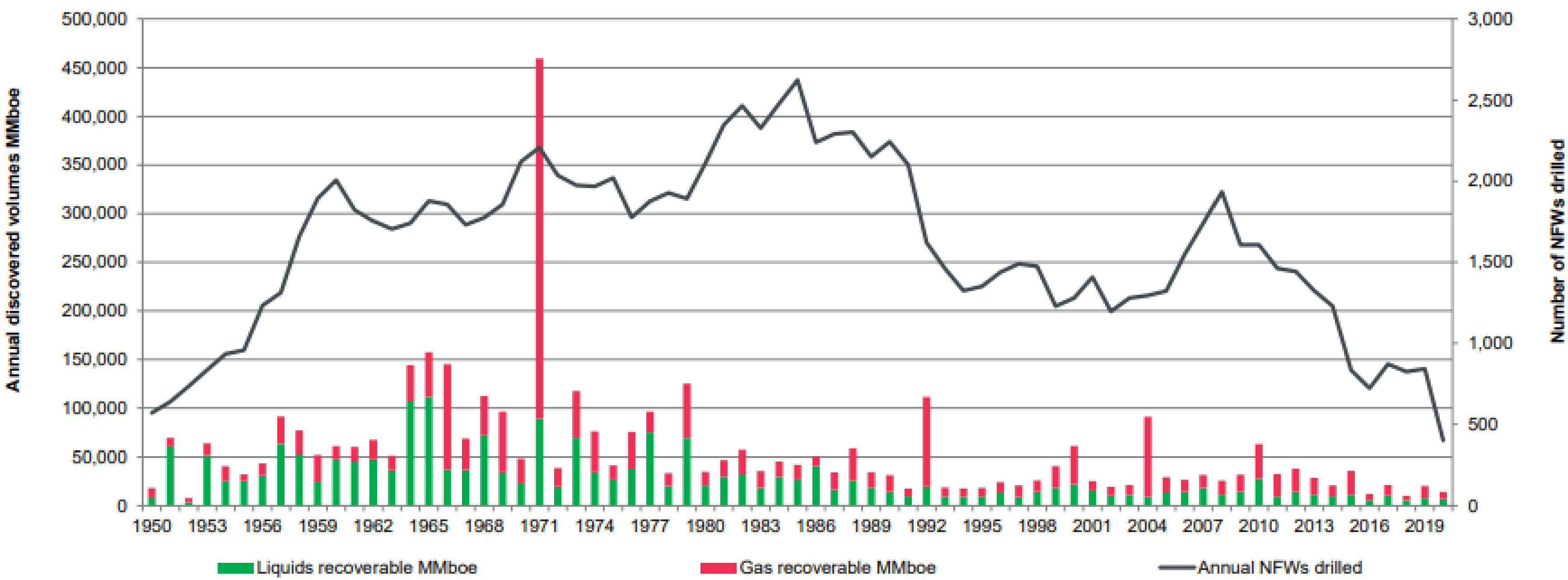


Source: Goldman Sachs

Exploration Levels are not Appropriate

In 2020, global exploration drilling activity and annual discovered volumes fell to levels not seen since the 1940s and early 1950s

Global conventional new field wildcats (NFWs) drilled and resources discovered, 1950–2020

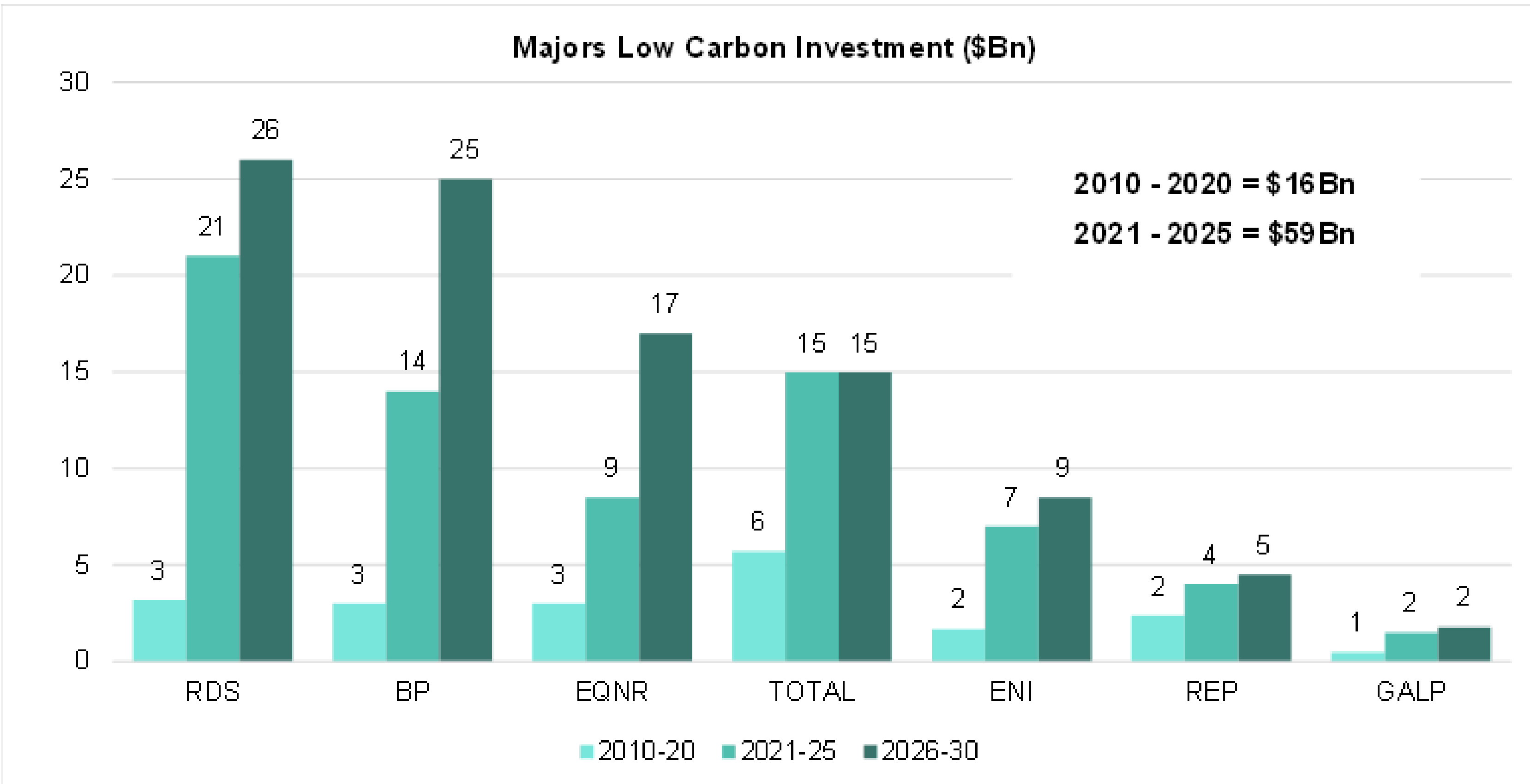


Source: Data taken from IHS Markit upstream E&P content (EDIN)

Note on selection of NFWs: For inclusion to these statistics an NFW will represent a global conventional exploration well and not be located within the onshore US Lower 48 or onshore Canada, will have spudded during 2020, and will represent the initial well on a structure/prospect.

Source: IHS

Global Oil: shifting capex to gas/low carbon



Source: Bernstein

Scoring the Energy Transition

Positives

- We are developing more energy sources for the world
- We are powering a new technological revolution
- We are scaling up new industries
- We are increasingly cooperating in areas that are critical to the environment and climate repair

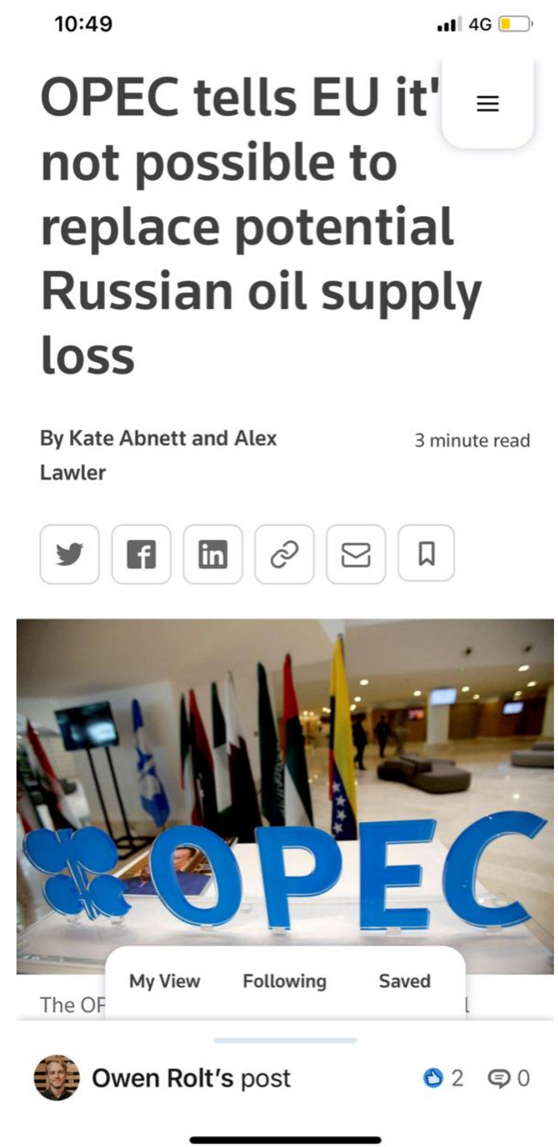
Negatives

- Uncoordinated, disorganized, almost one sided - confusion
- 80% of what powers the world is being penalized
- Creating significant dislocations, temporarily ignoring mayor issues
- Countries are experiencing higher bills, energy poverty

Source: Ivan Sandrea

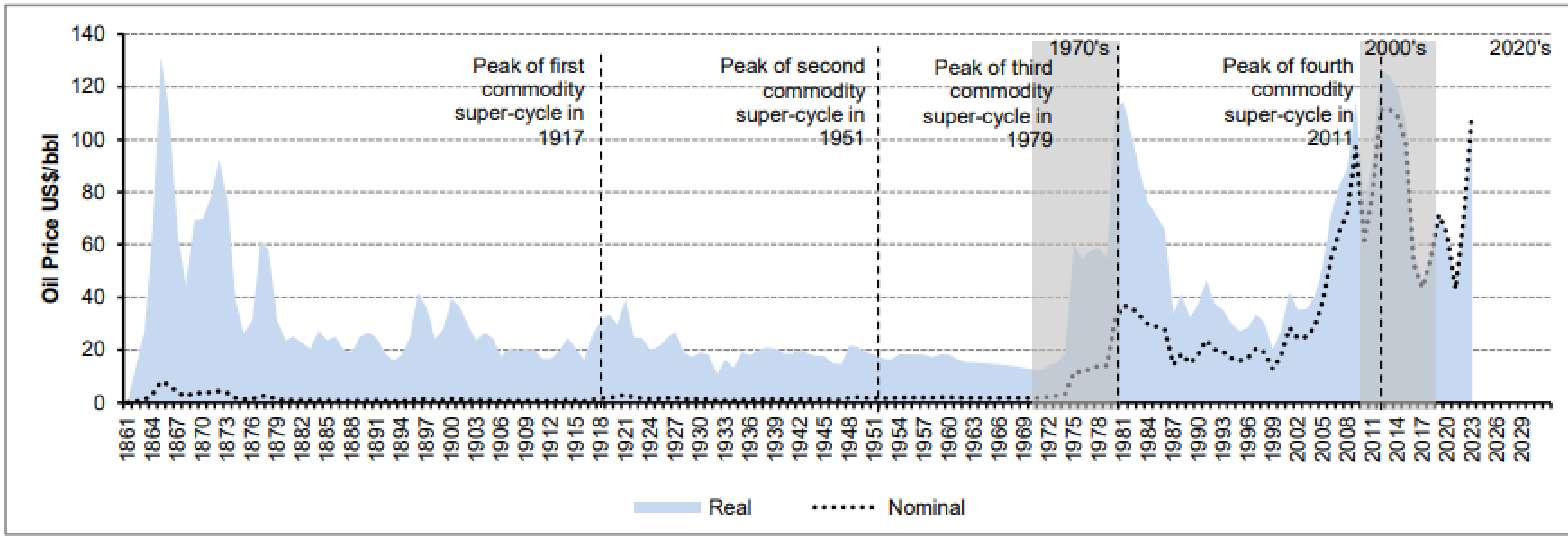
Implication for Oil Markets

- High price environment and a new fundamental support
- Demand scenarios are all over the place…
- Industry is likely to increase investments gradually in the short term. Long term is not yet clear
- Some countries will open areas, others will not
- Political instability in exporting countries is likely to lessen



Source: Ivan Sandrea

Is there a fourth super cycle coming?



Source: The Growth of Integrated Oil Companies, EIA Performance Profiles Year Book, Company Reports, BP Statistical Year Book, Bloomberg, Bernstein analysis and estimates

Source: Bernstein

The Energy Pentagon: Pillars for a Successful Transformation

- Promote Energy Diversification of All Sources
- Promote and Make Investments
- Decarb the Demand and Supply side
- Promote Efficiency
- Promote Cooperation
- Energy must be Available and Affordable
- Better Leadership

Source: Ivan Sandrea

10 Principles for Energy Leadership

- **Defend passionately the energy sector and make it better.**
- **Inspire others to continue to deliver the energy the world and society needs. We need a bigger industry.**
- **Address social demands, including safety, environmental stewardship, affordability, and climate change, in a realistic and truthful manner.**
- **Focus on long term results not short-term wins.**
- **Take risks (after prudent analysis)…not exercise mindless enthusiasm.**
- **Be an energy entrepreneur.**
- **The is no shortage of resources. We have more (quantity and knowledge) of resources today than ever before.**
- **Every year energy consumption increases.**
- **Focus on society, and Planet A to provide the best possible quality of life to 8bn people and more.**
- **Knowledge and leadership can be mutually exclusive in many cases BUT not in energy sector!**

Source: Ivan Sandrea

- **We need better energy leaders and institutions.**

- **Instead of leaving a better (cleaner) planet for our children, we should leave better children for our planet.**

Source: Ivan Sandrea, Clint Eastwood