

With Brad Olsen, energy investor with background in Russia

- The first major invasion in continental Europe in 80 years: why now?
- How does Russia's invasion of Ukraine change commodity markets?
- Do we have any historical parallels to draw from as investors?
- How does this change the outlook for traditional O&G vs. Energy Transition?

20 years ago: happier times in the relationship between Russia and the West



Unlike Europe (and the US), Russia never stopped viewing oil and gas as strategic

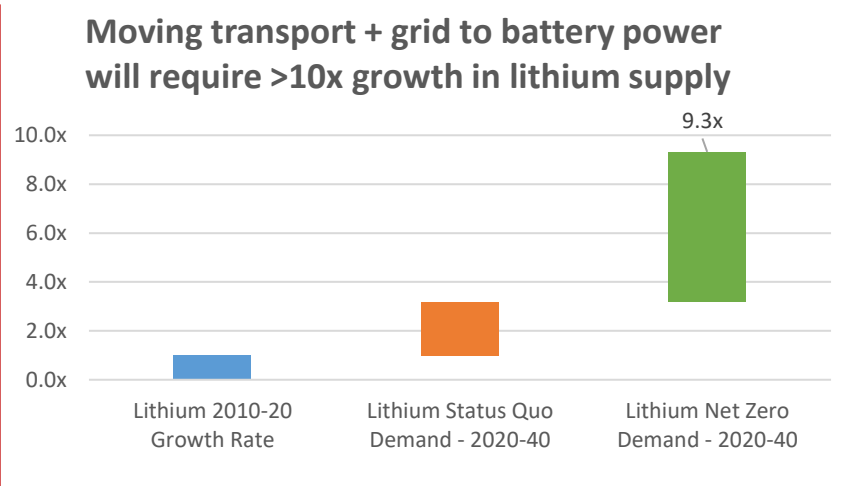
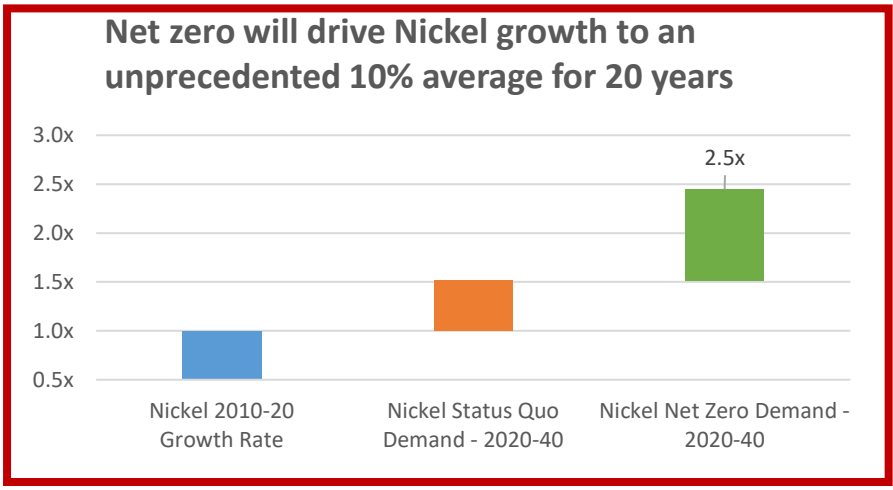
For 50 years, Russia's foreign stance has been directly determined by its oil and gas revenues



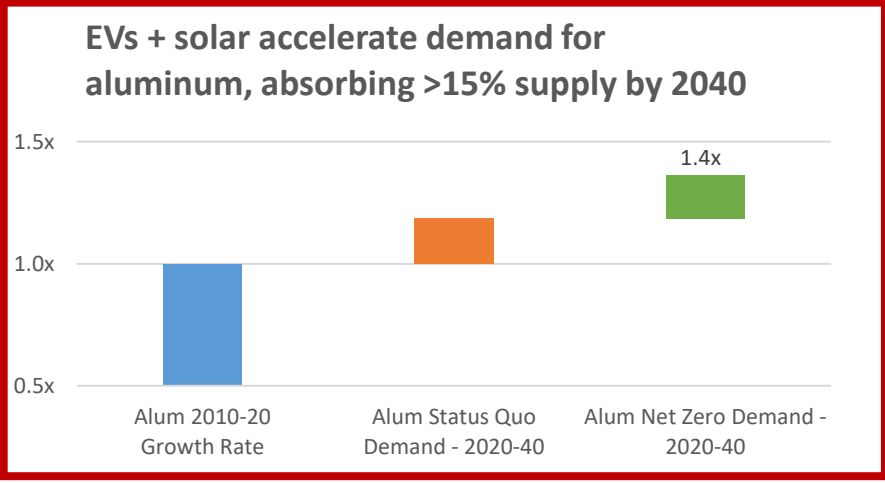
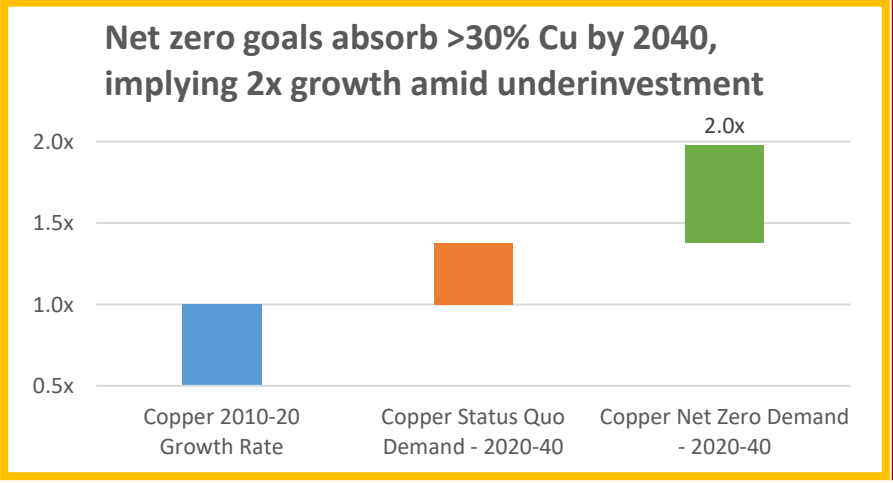
Source: Recurrent research, Bloomberg data.

Energy Transition inputs – Russia is a top producer of aluminum, copper, nickel

OUR 2017 PAPER ON BATTERY BOTTLENECKS - CONFIRMED BY IEA IN 2021...



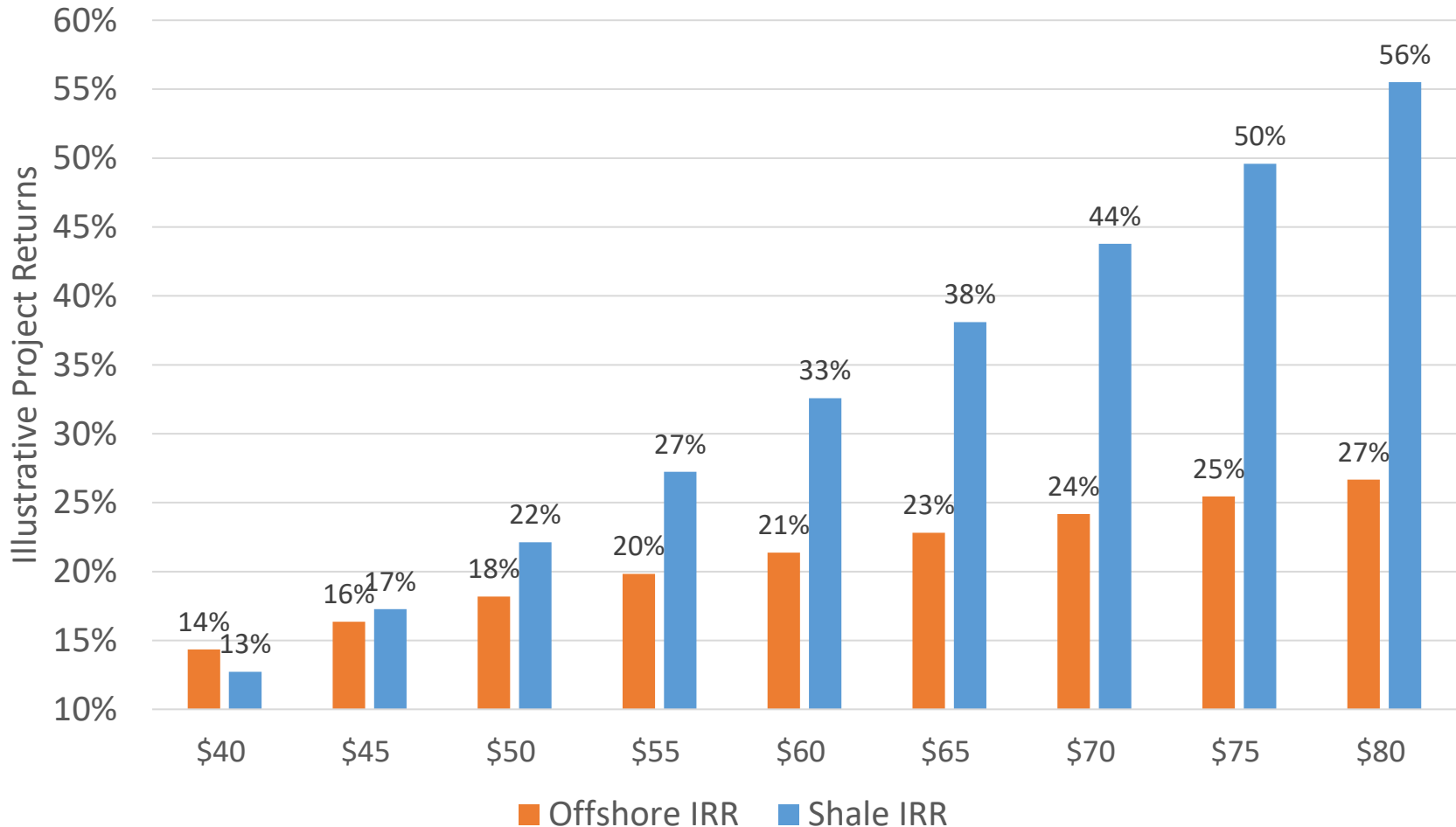
...NOW FOCUS TURNS TO METALS DEMAND FROM GRID TRANSFORMATION



Source: Bloomberg, IEA, Recurrent research. Note: IEA's May 2021 confirmed a 13x to 42x increase in lithium demand from clean tech demand through 2040, as well as 6x to 20x increases in nickel/cobalt, based on "status quo" energy transition policies and policies consistent with "net zero" emissions by 2050.

The ESG movement has increased energy's cost of capital, favoring short-cycle projects

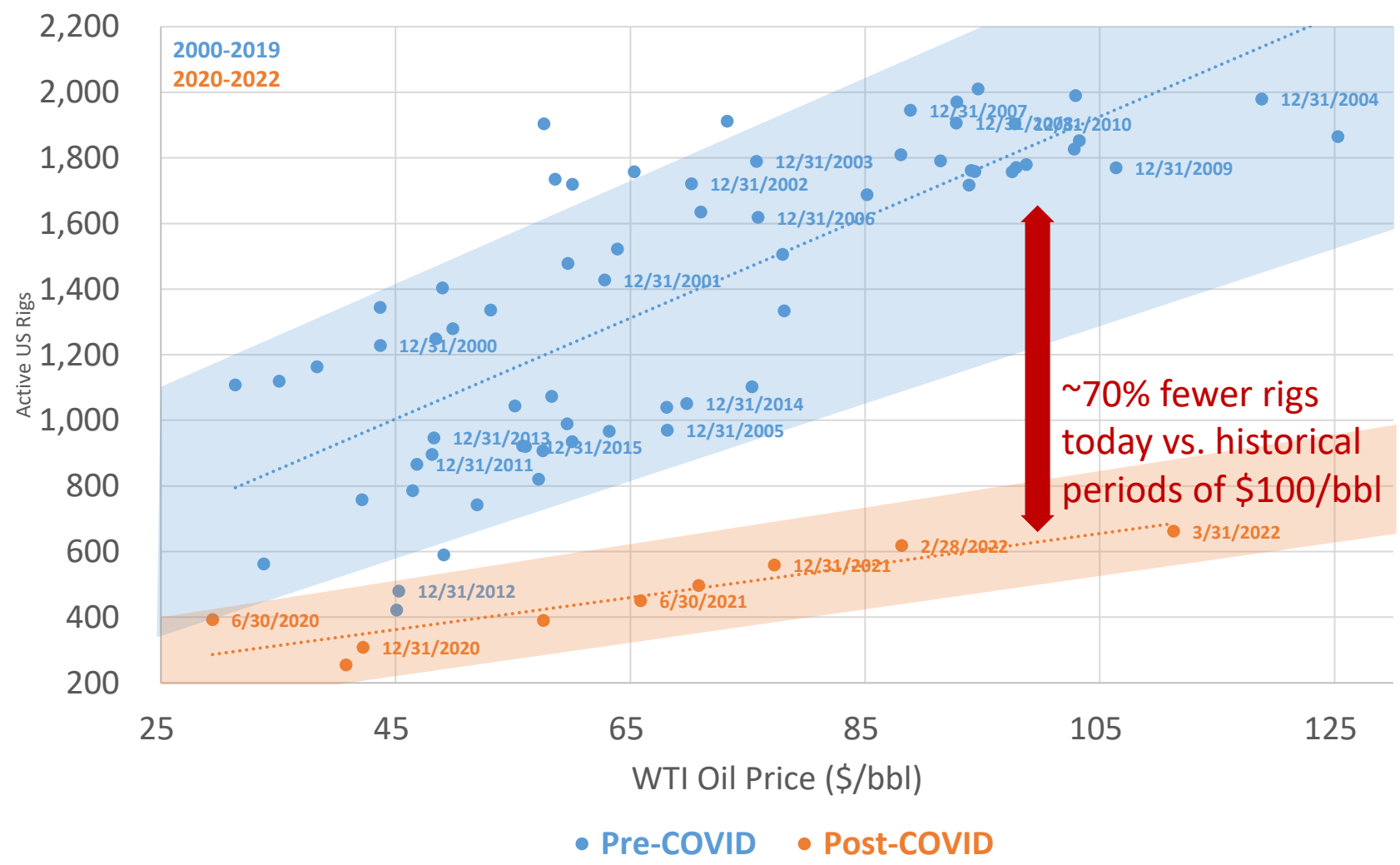
Short-cycle shale vs. long-dated megaprojects: Illustrative returns from \$40/bbl to \$80/bbl



Source: Recurrent research, Bloomberg data.

Capex should grow in response to rising risk premiums... but it hasn't happened (yet)

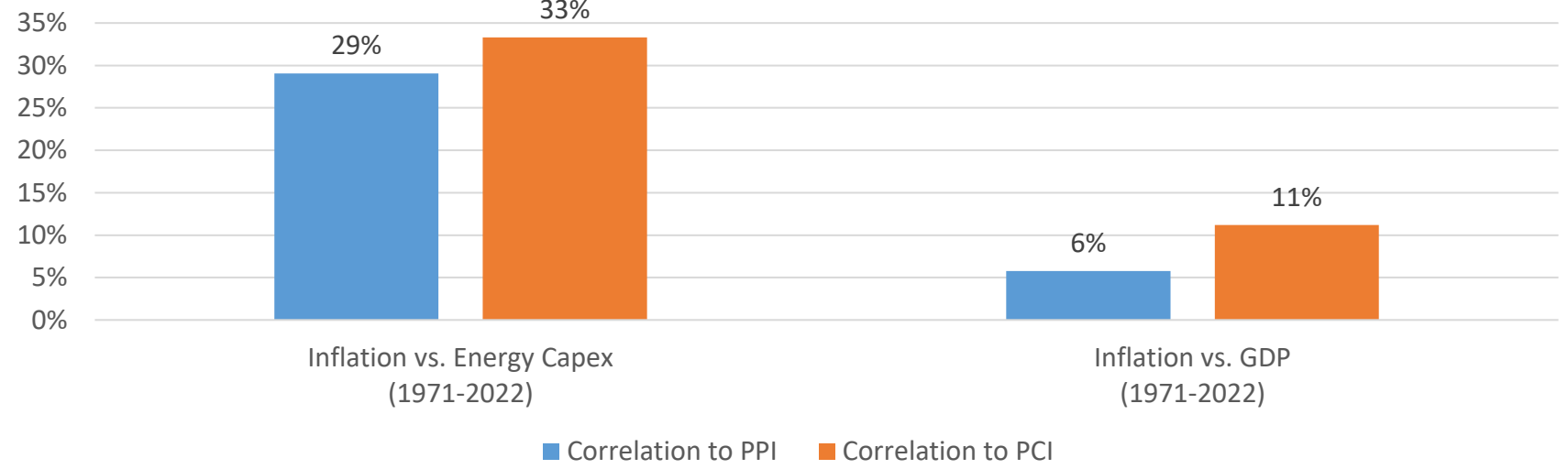
US Active Rigs vs. Oil Price



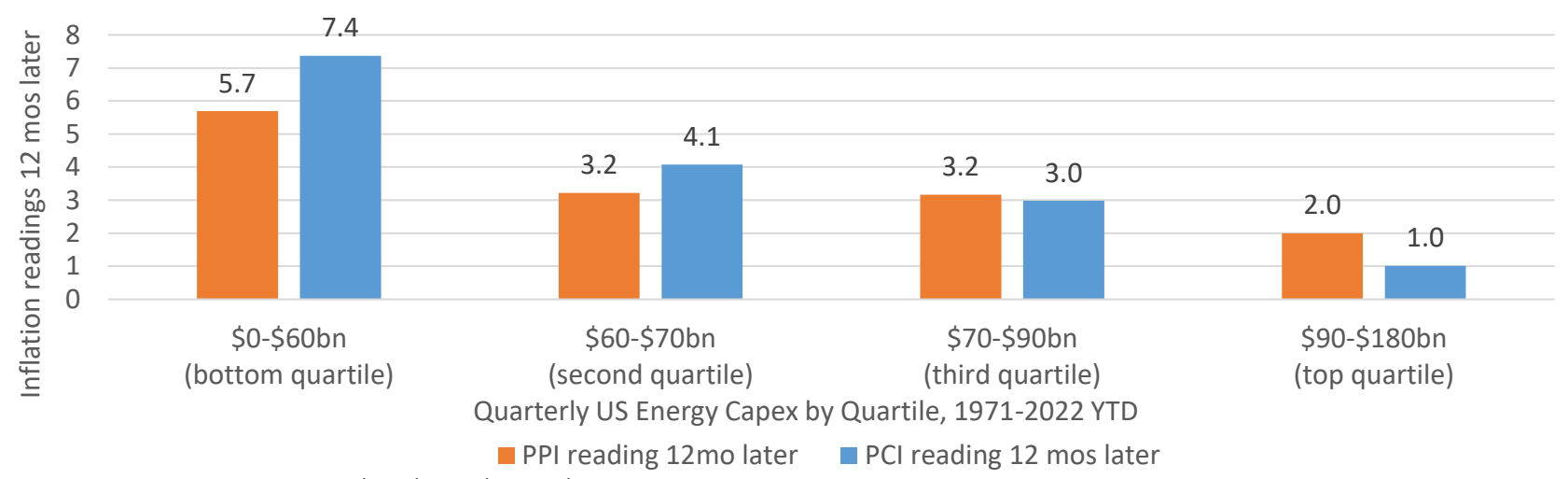
Source: Recurrent research, Bloomberg data.

The Fed tries to slow \$100tn of global GDP because markets won't fund ~\$200bn capex

Energy capex drives commodity inflation, moreso than GDP growth



PPI Inflation depends largely on last year's capex



Source: Recurrent research, Bloomberg data.