The Role of Innovation and Collaboration in Successfully Navigating Energy Transitions

Greg Leveille

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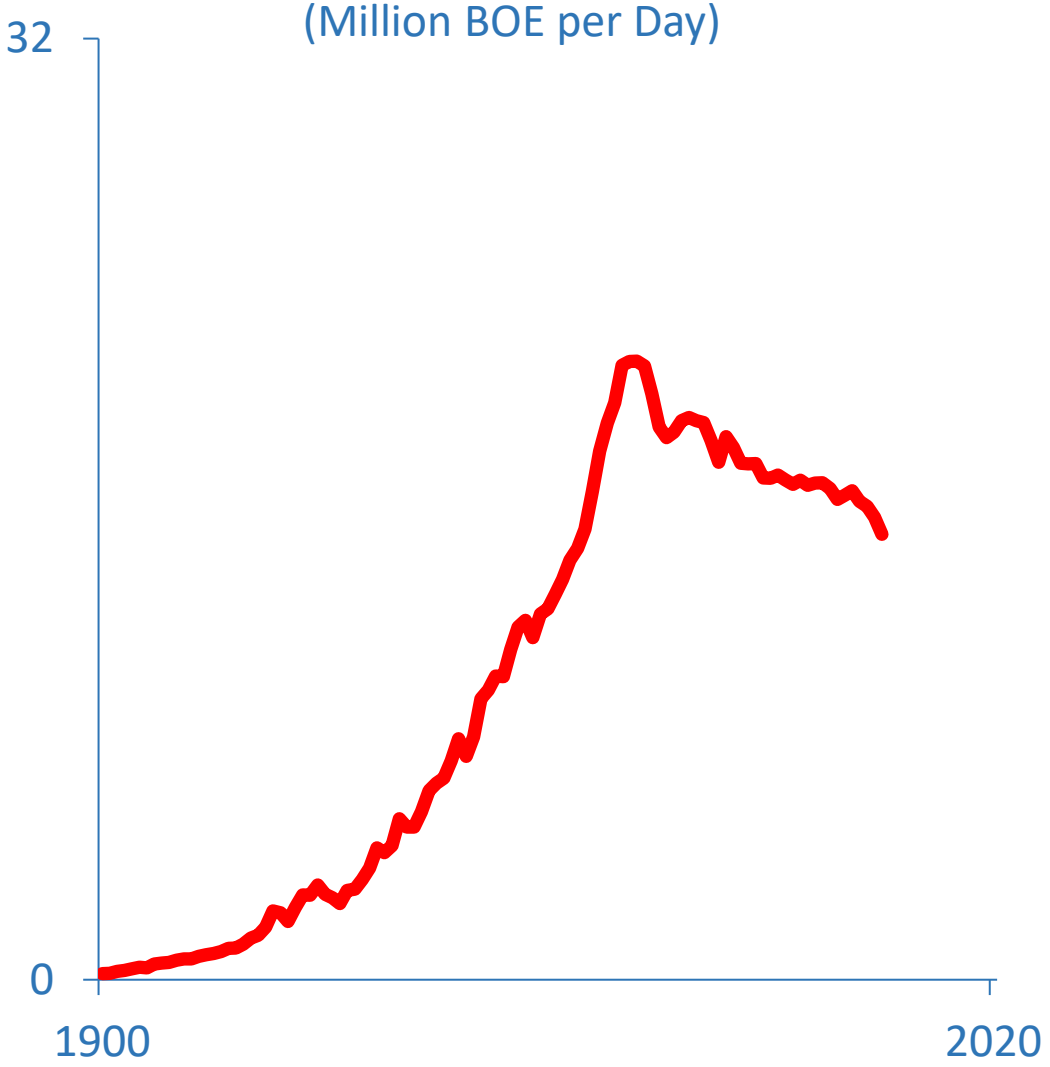
America was grappling with a challenging energy transition at the turn of the century

U.S. Hydrocarbon Production

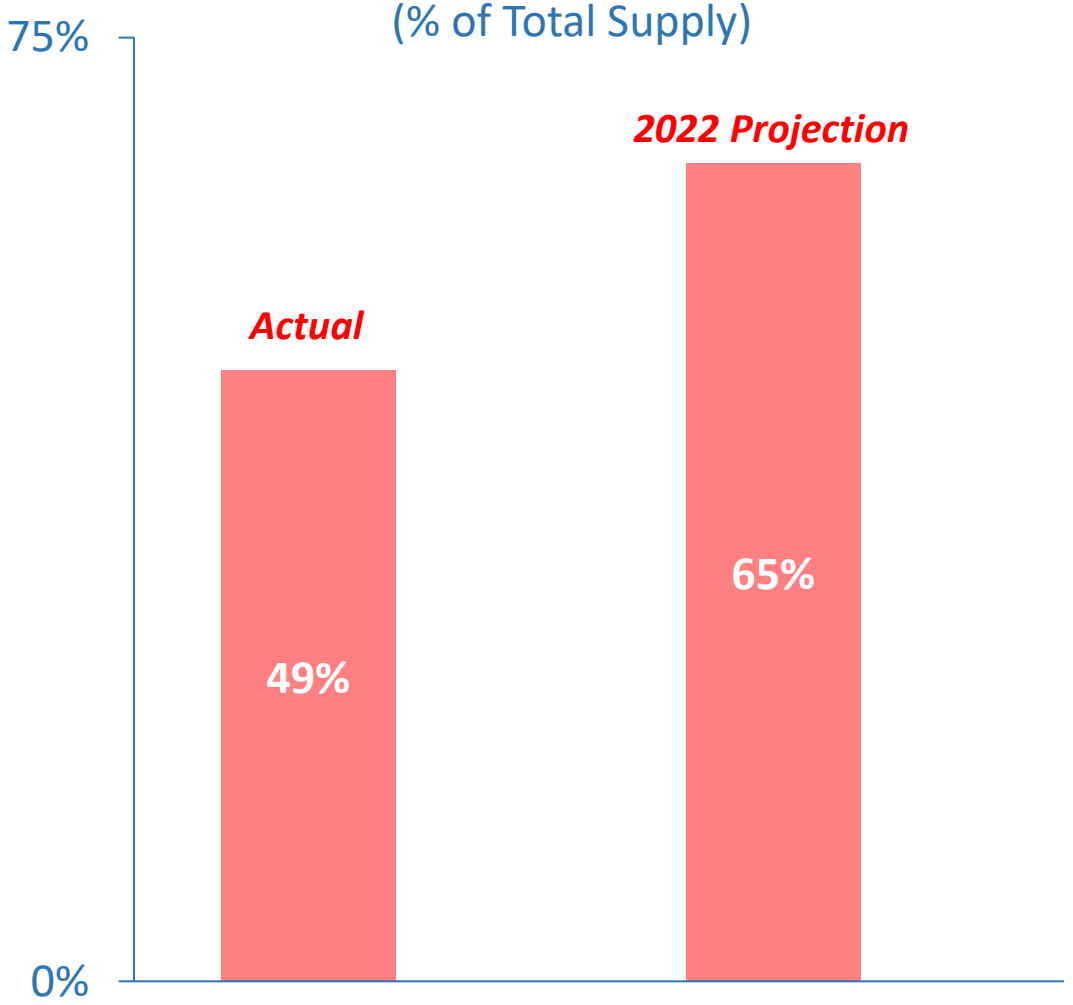
(Million BOE per Day)



Source: Post 1965 to 2005 from BP Statistical Review of World Energy 2021 report; Pre-1965 oil production from EIA; Pre-1965 gas volumes estimated from multiple sources.

U.S. Hydrocarbon Net Imports

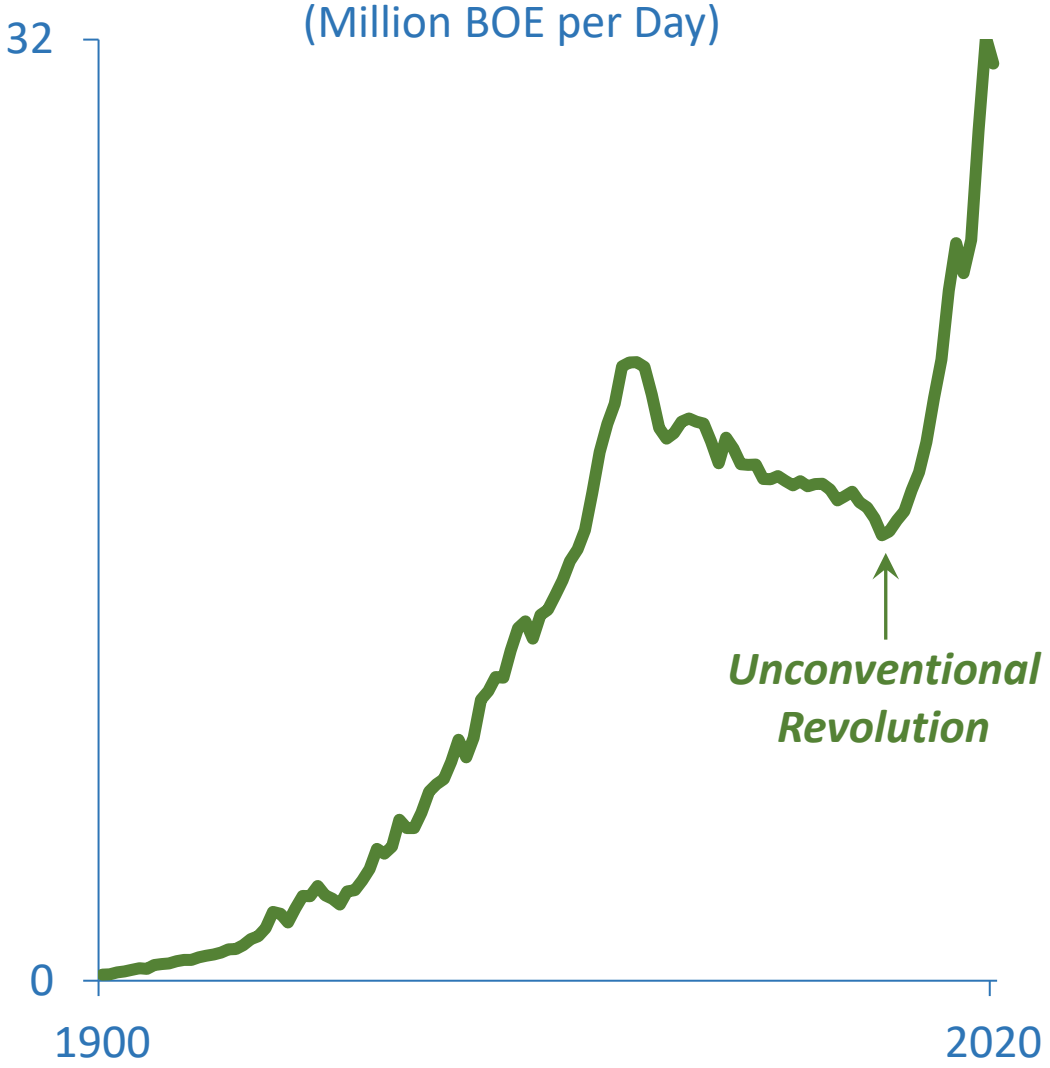
(% of Total Supply)



Source: 2001, 2005, and 2022 EIA Annual Energy Outlooks

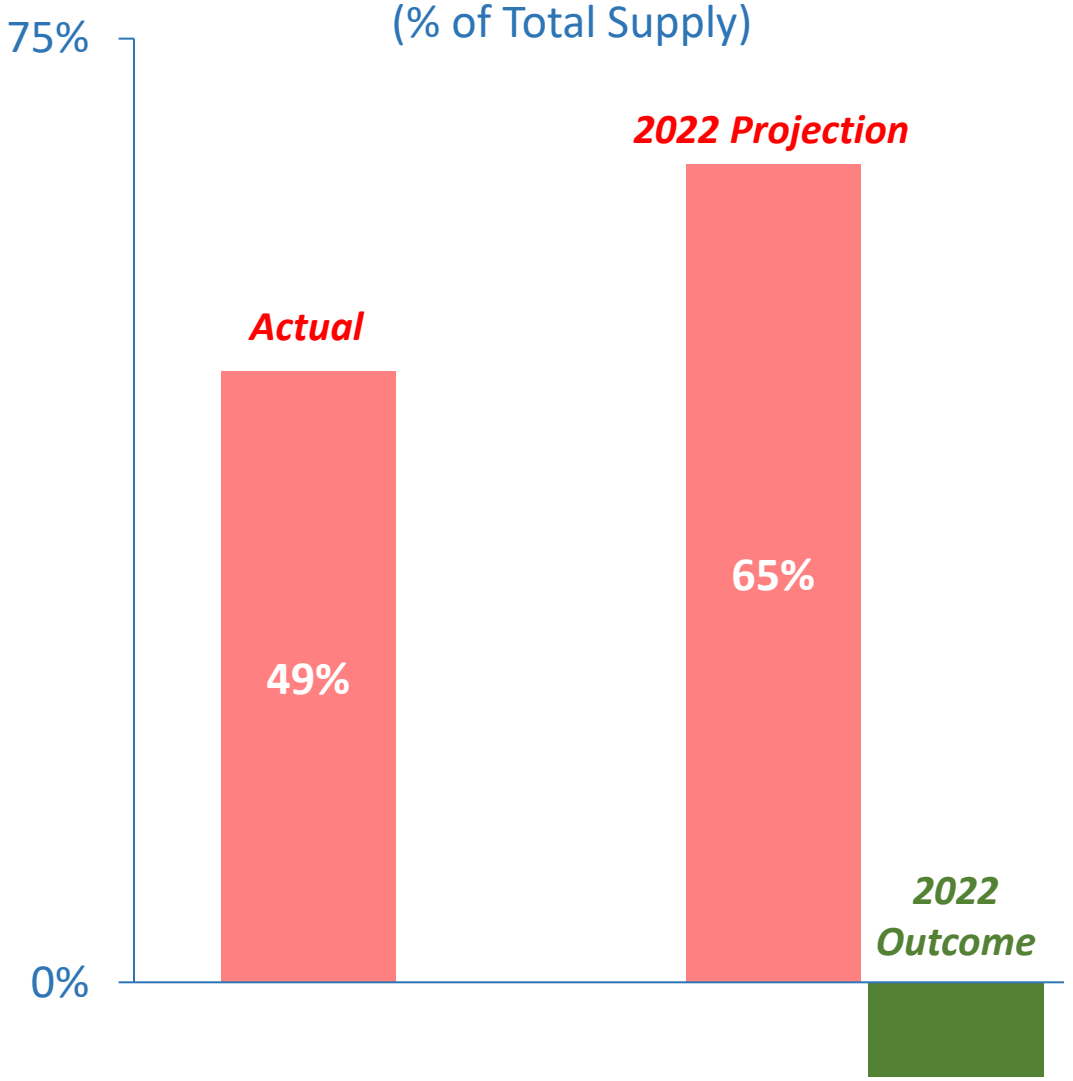
Unconventionals solved the transition challenge in an unexpected way

U.S. Hydrocarbon Production



Source: Post 1965 to 2020 from BP Statistical Review of World Energy 2021 report; Pre-1965 oil production from EIA; Pre-1965 gas volumes estimated from multiple sources. "Hydrocarbons" = crude oil, condensate, natural gas liquids, and natural gas. Excludes refinery gains.

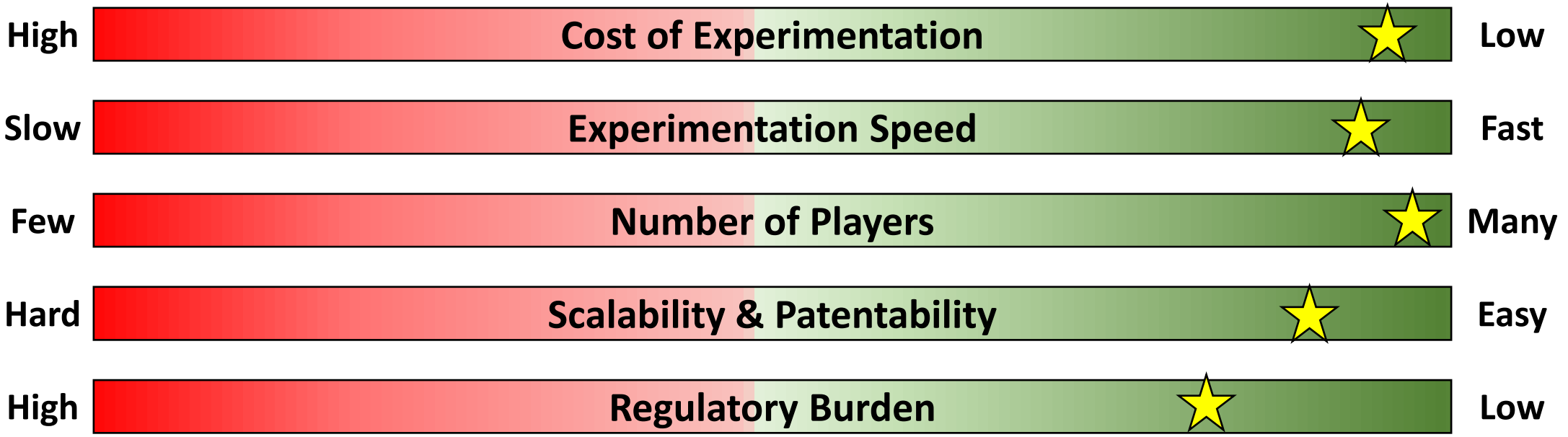
U.S. Hydrocarbon Net Imports



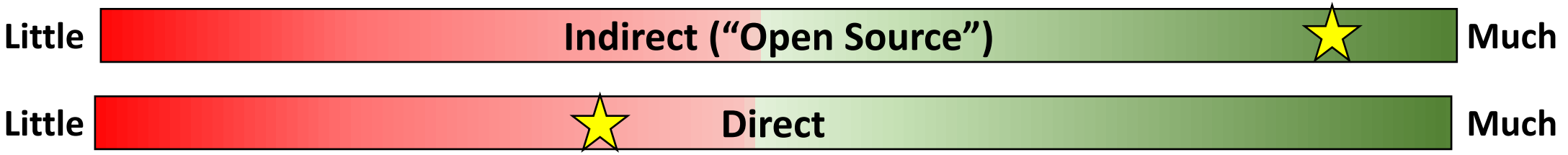
Source: 2001, 2005, and 2022 EIA Annual Energy Outlooks

World-class levels of innovation and collaboration enabled this outcome

Unconventional Revolution Innovation Success Factors



Unconventional Revolution Collaboration Methods

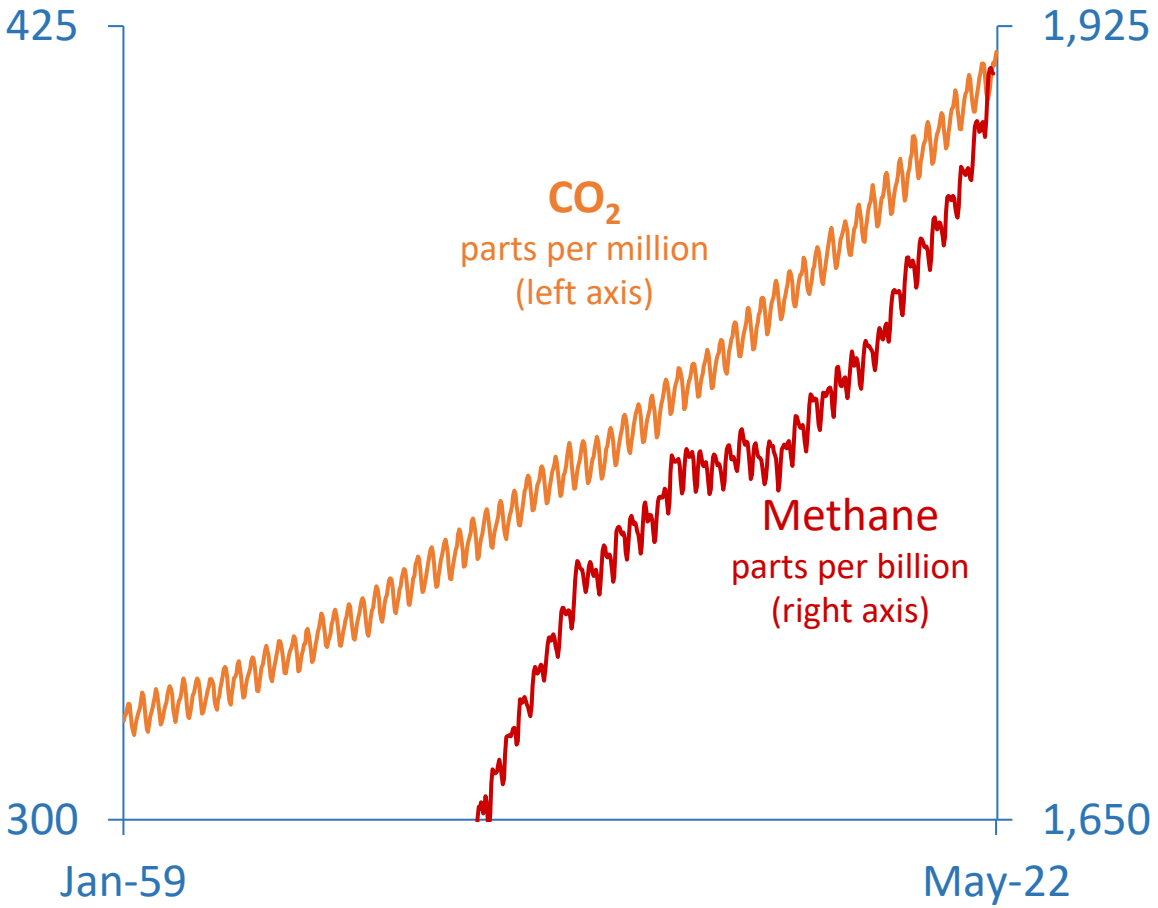


Climate change concerns indicate another transition is required – this one global in scale

Atmospheric GHG Levels are Increasing

Atmospheric CO_2 and Methane Levels

(CO_2 ppm; Methane ppb)

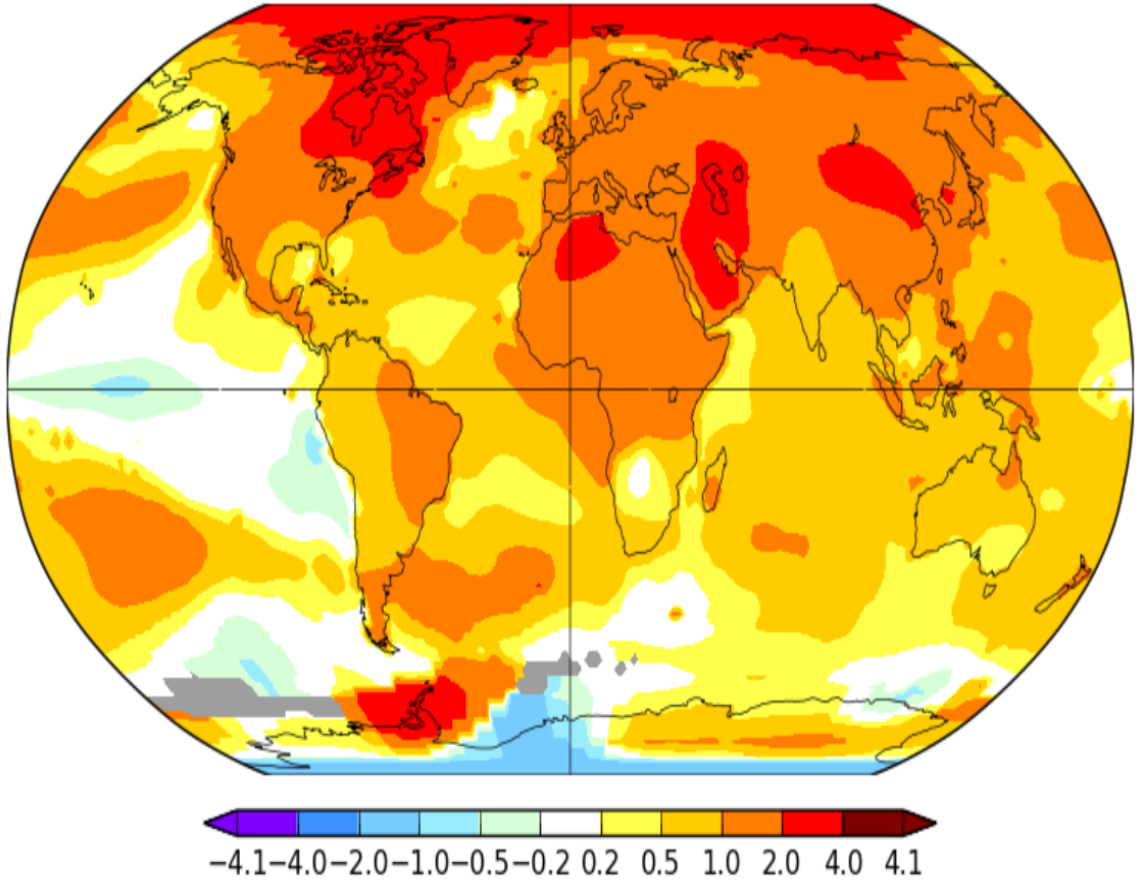


Source: NOAA Global Monitoring Laboratory, Earth System Research website; June 2022

Surface Air Temperatures are Rising

2021 compared to 1951 – 1980 Mean

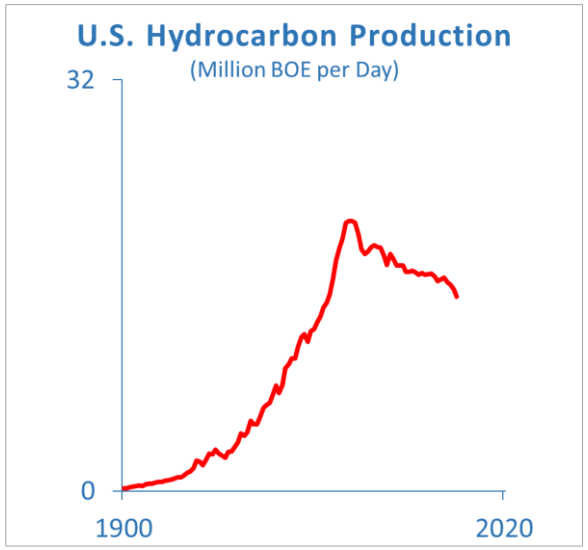
(Degrees Celsius)

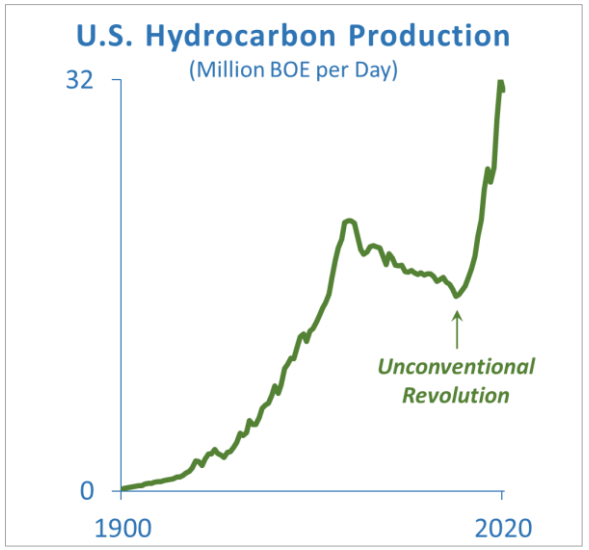


Source: NASA Goddard Institute for Space Studies; GISS Surface Temperature Analysis (v4); June 2022

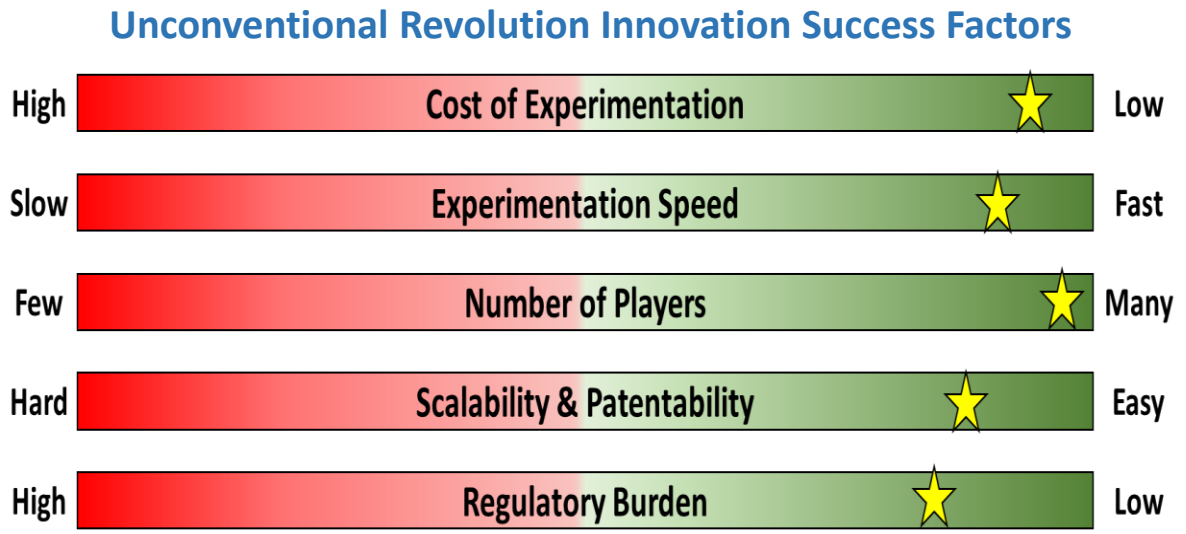
Applying lessons learned from past transitions will be critical for future success

Expect the Unexpected

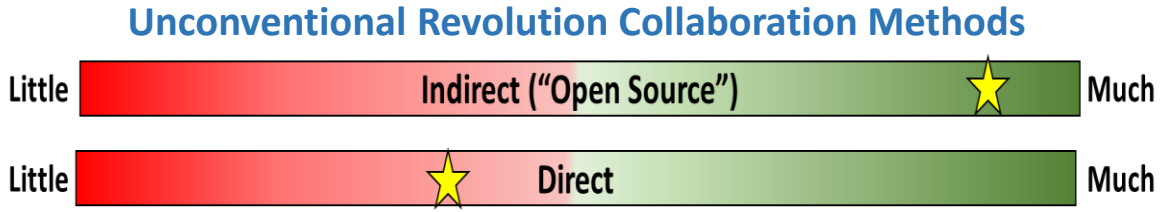




Concentrate on Favorable Innovation Niches



Develop an Innovation Collaboration Strategy



Remain Optimistic

While transitions are fraught with peril, our industry has for >160 years overcome all obstacles

The future is full of opportunity to add value via innovation & collaboration

- Further ***improve recovery*** of hydrocarbons from unconventional reservoirs
- Further ***lower costs*** of drilling, completing, and operating unconventional wells
- Identify and deploy methods to ***minimize scope one and two GHG emissions***
- Identify, prove up, and ***commercialize low and no carbon energy sources***
- Find ways to directly ***reduce the level of GHGs in the atmosphere***