



Economic & Policy Considerations

Reserves Symposium, July 19, 2011

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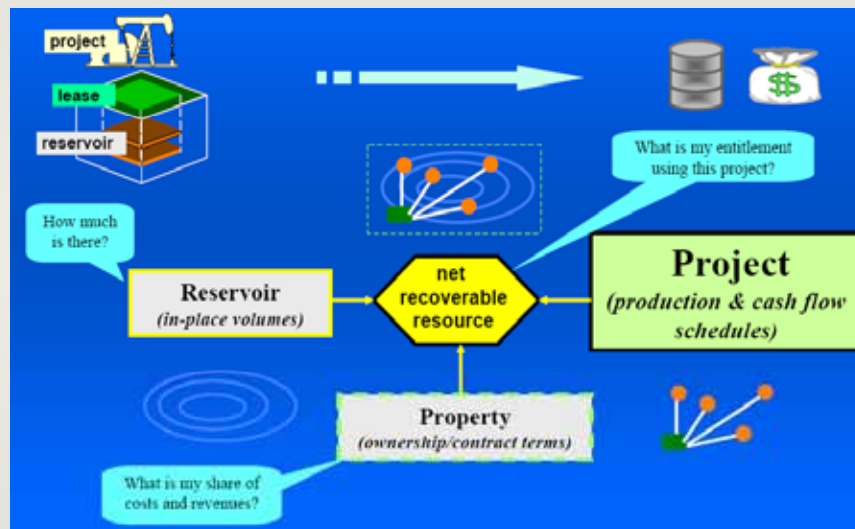
Do You Believe???

- Reserves estimation is “science + art”
- Usefulness of reserves is contingent on confidence
 - Reliability, quality of reporting
 - Due diligence is equal opportunity, but costly
- Frontier, unconventional plays raise new challenges
- FD cost, commodity price variability

“Art”: A Proposed Definition

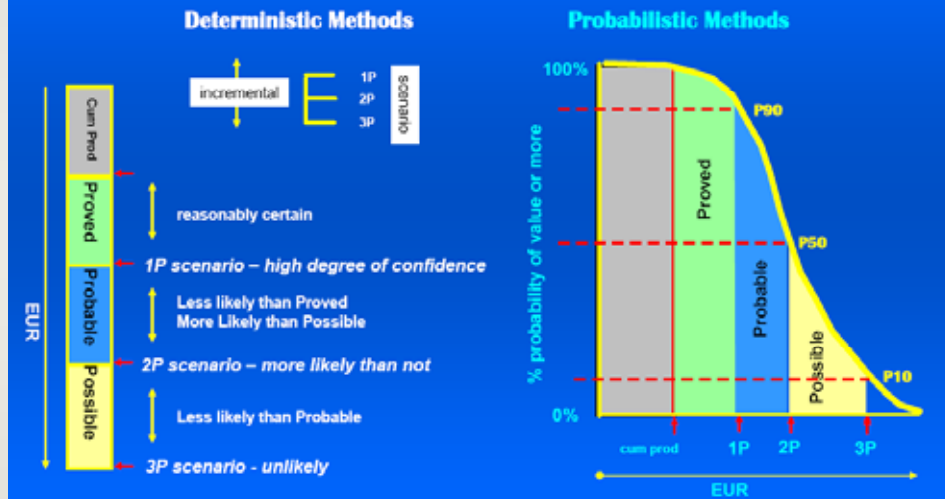
The ability to *visualize, build* and *execute* a concept for *optimal commercialization* of upstream assets based on valuations using *thorough analysis of, and reasonable and sound scientific interpretation of*, G&G and engineering data and information.

Project Based



SPE Description of Uncertainty

The system accommodates multiple approaches to assessing uncertainty.



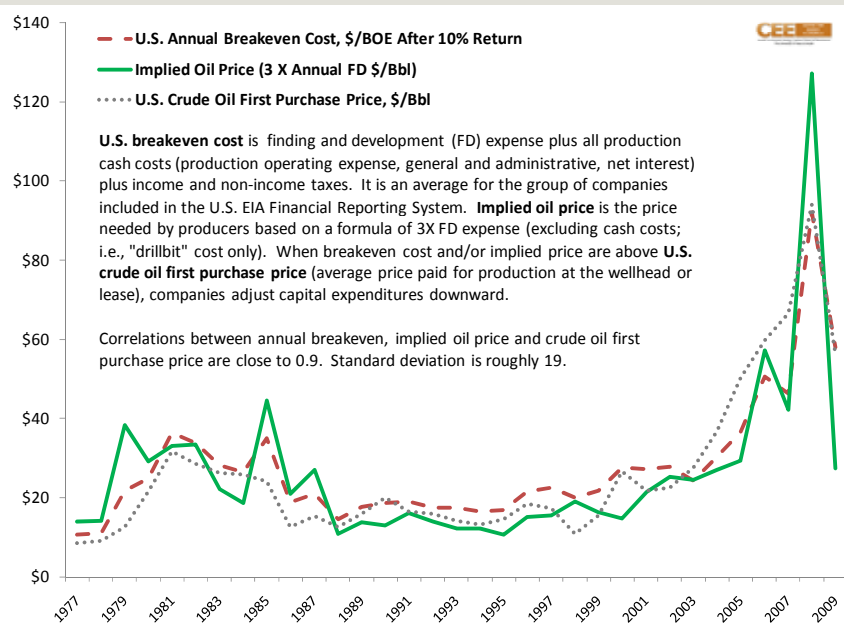
Reserves and Financing

Lenders, investors seek “commerciality”:

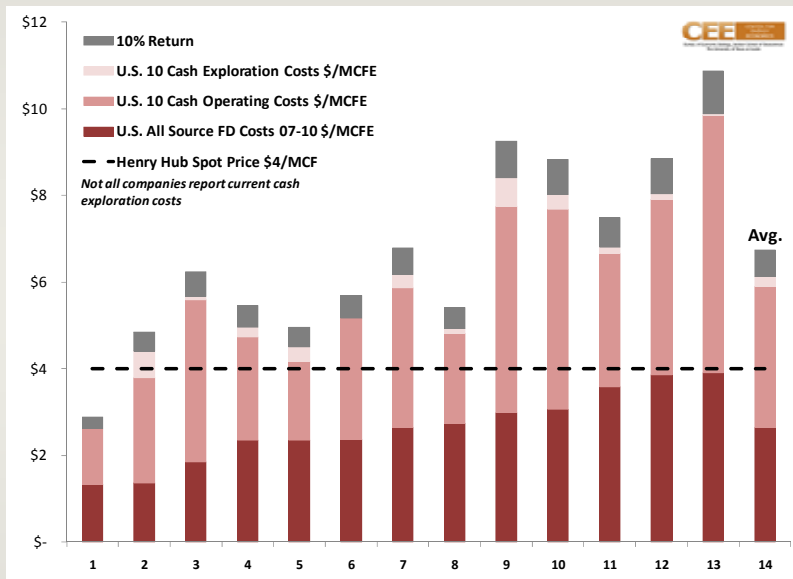
- Independently audited reserves figures
- Proved reserves as collateral
- Development plan (reasonable timetable)
- Access to market (infrastructure is/can be available)
- Risk assessment
- Overall, positive financial metrics

Reserves Definitions Matter

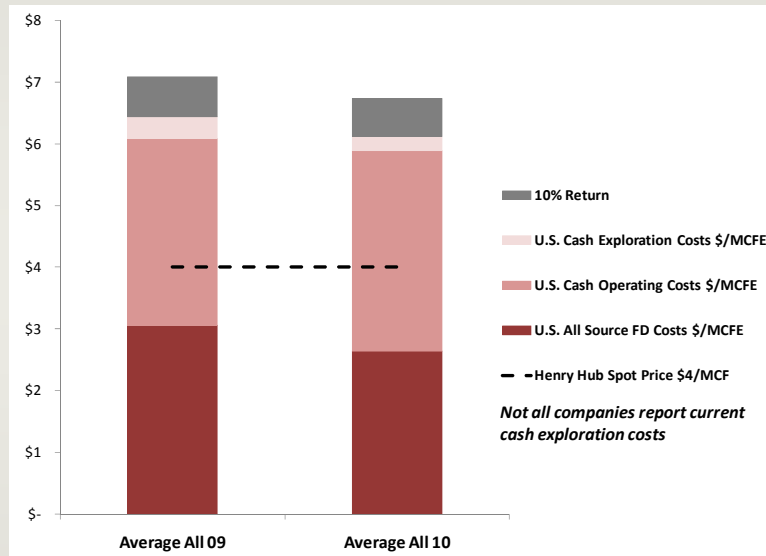
- IOCs investing globally have to comply with regulations and market expectations
 - Fiscal regimes have to be conducive to reporting and revenues to shareholders
- Governments and NOCs
 - Petrobras pays Brazilian government about 50% of value it generates
 - Pemex pays Mexican government about 80% of value it generates



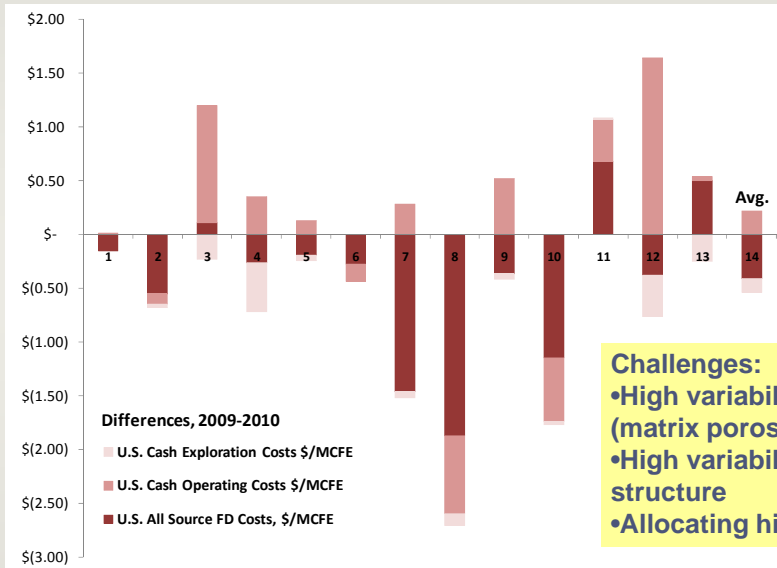
U.S. Nat Gas Cost Structure, 2010



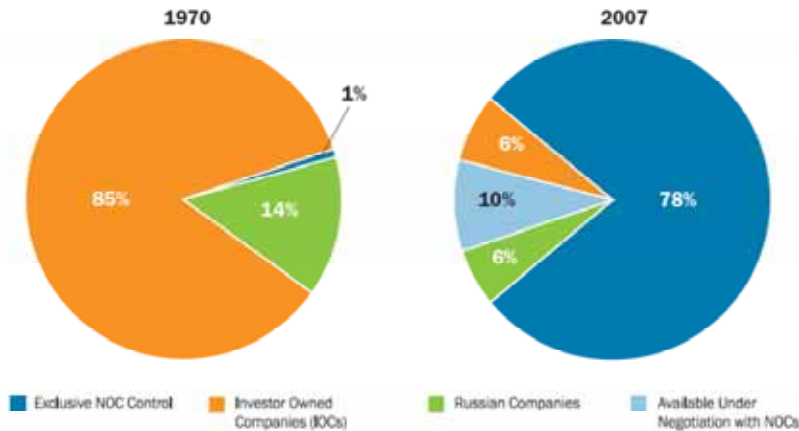
Average Change, 2009-2010



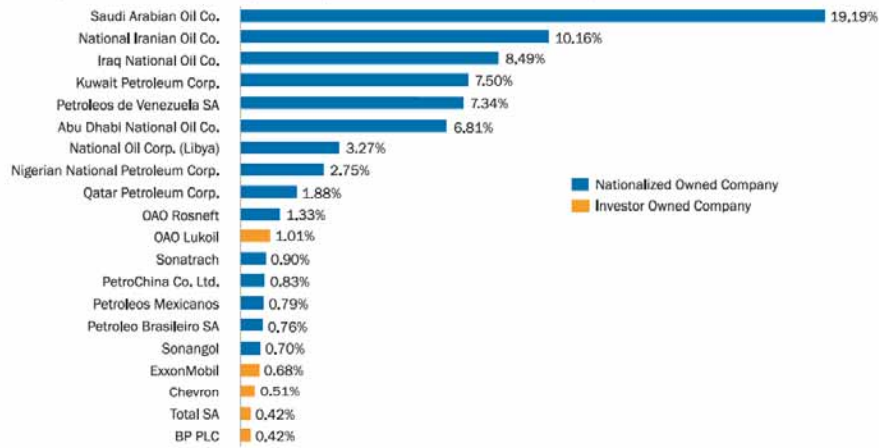
Average Change, By Company



The Myth of "Big Oil" (As a Percent of Proven Reserves) National Oil Companies (NOCs) Increasingly Control the World's Oil Reserves

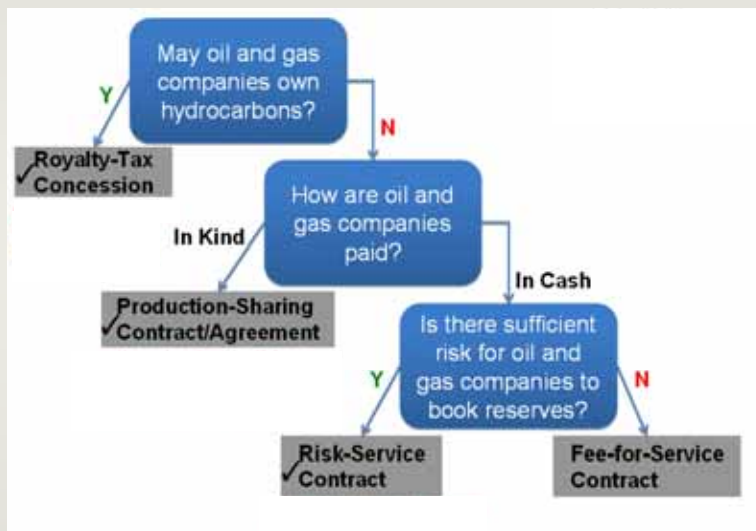


2009 Largest Oil and Gas Companies (percent of worldwide reserves)

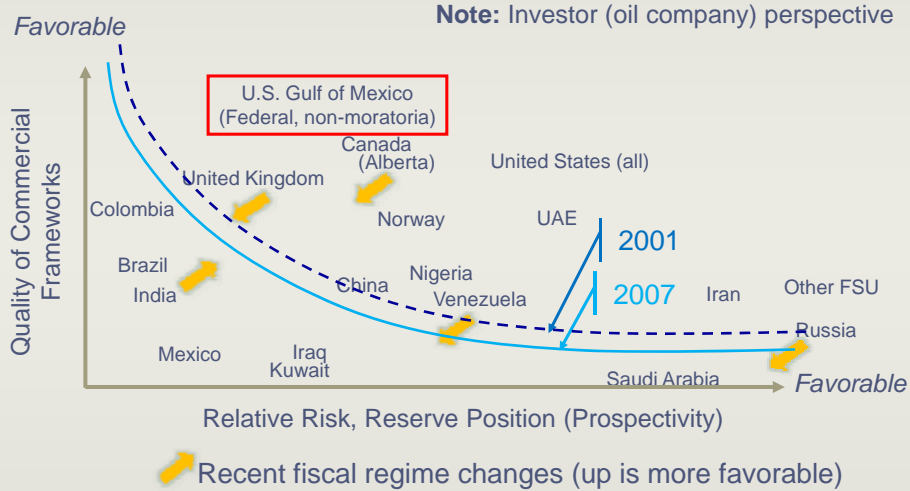


Source: Calculated from World Reserves of 1.3 trillion barrels as of January 1, 2010 according to *Oil & Gas Journal*, December 6, 2010 and leading companies according to: *Oil & Gas Journal*, September 6, 2010.

Fiscal Agreements Decisions



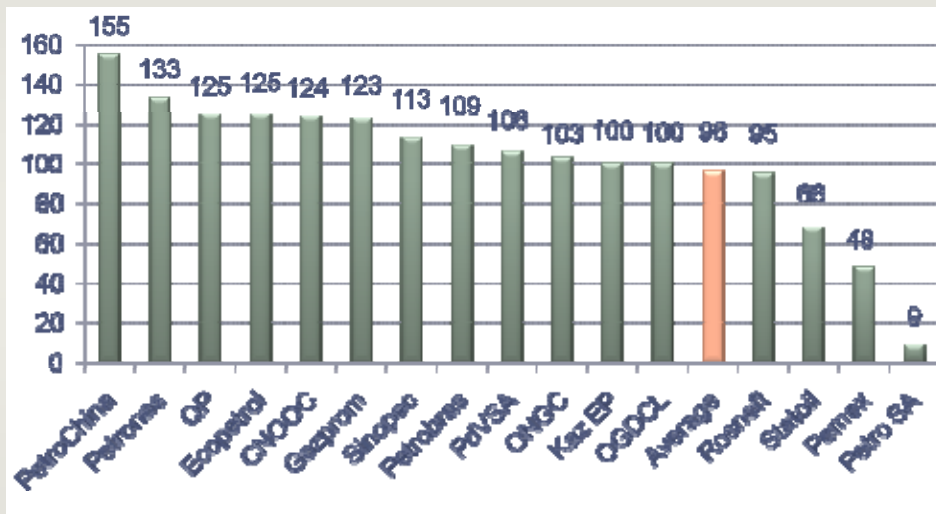
Upstream Regimes



Approximations based on Foss, et al., 1998, Best Practices in Energy Sector Reform (CEE-UT).

©CEE-UT, 15

Reserves Replacement Rate (%) 2004-2009 Average Each NOC



Rosneft and Gazprom exclude Yukos acquisition.



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All Source Reserve Replacement Cost US\$/BOE 2004-2009 Average Each NOC



* Companies with less than 6 years of data

Conclusions

- It's not a perfect world
 - Transparency is critical
- Technical challenges need to be addressed
 - Everyone loses if envelope pushed too far
- Substitutes to reserves are not attractive