### COMPLEXITY, AMBIGUITY 🗟 VOLATILITY

#### LEADING IN THE NEW NORMAL





#### 47TH ANNUAL ECC CONFERENCE

## **Plenary Session 2**



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### Fossil Fuels at a Crossroad: Transformational Trends in Oil and Gas





**REAL LEADERSHIP** 

**ON ENERGY** 

1. What type of company do you represent: 1. Owner 2. Contractor 3. Supplier 4. Academic 5. Other

2. Which do you think will be closer to the average breakeven cost for Permian Basin shale oil by 2017?

1. \$50 a barrel

2. \$35 a barrel

3. \$20 a barrel

### 3. Do you think West Texas Intermediate crude oil will rebound to \$80 sometime in 2016?

Yes
No

4. Do you think that demand will peak at 100 to 110 million barrels a day some time after 2035 or do you think it will rise to above 120 million b/d in the 2040s?

Peak
Rise

# Oil is a cyclical industry, linked in large measure to the global business cycle.



Curent oil price collapse mirrors similar cyclical downturns seen in past decades. Cycle shifts tend to have similar characteristics:

 Demand destruction: A decade of high oil prices, combined with policy intervention in the OECD and China slowed oil demand growth and enabled innovation and advanced clean energy solutions. Financial crises also associated with high oil prices and recession curtails demand.

• At the same time, high oil prices stimulated drilling innovations, leading to a supply bubble. Shale technology is game changing, just as deepwater drilling in the North Sea and US Gulf of Mexico was in the 1980s.

#### First Rule of High Oil Price Thermodynamics: Governments Intervene in Markets US Stimulus Hits the Energy Jackpot Twice at Once







## How to Assess the Nature of Current Downside Price Risk: Is it shortlived or structural?

# Project complexity causing cost overruns which must be addressed more effectively in low price environment

Exploration and Production managers are dealing with increasing project complexity and more challenging operational environments.

Cost overruns are pervasive. Contributing factors include: complex subsurface geology, highly advanced and innovative engineering requirements, infrastructure challenges, environmental and social demands, currency risk, geopolitical risk and regulatory risk.



# Onshore productivity, innovation creating new competitive landscape for capital and changing long term price outlook

Smaller, nimbler and entrepreneurial Independents assembling valuable portfolios of assets, such as the shale oil and gas plays, outperforming large peers and continuing to attract institutional capital.

To date, falling service costs, increased productivity and large hedging programs have protected the top independent operators from feeling the pain of oil and gas price declines. #4: Independents' Improvements in Initial Productivity by Shale Play Efficiency Gains in Both Oil and Gas Shale Plays



### Three Major Lynchpins to High Price Psychological "Exuberance" Have Dissipated

- 2002-2015 up end of the price cycle was mainly driven by three characteristics that no longer prevail:
- "Peak Oil" theory
- Steady, Rapid Chinese "Demand" based on Industrial Growth
- Rising upstream services costs

# How has Wall Street calculated the bottom? Analysts presuming oil is reverting to its historical mean...

- Adjusted for inflation, oil has reverted back to a historical mean ~\$25 / barrel (1982-84 real prices)
- Real prices averaged ~\$14/bbl for a period of 15 years (1986-2001) or ~45% lower than current levels; the implied nominal price based on today's dollar would be ~\$33/bbl
- Wall Street analysts Barclays, Citi, JP Morgan and Goldman Sachs have cited nominal oil price levels in the \$35-55 range for 2015E growing to the \$45-73 by the end of 2016E. Goldman Sachs puts long term oil prices (to 2020) at \$50
- Operating costs for E&P companies have reduced by ~20-30% with breakevens in certain basins in the \$40 range

### Upstream Cost Deflation Underpins Market Equilibrium at Lower Price Levels

- Shale already benefiting from 25% cost deflation but more cost reduction is possible.
- Deepwater: 50% drop in rig day rates but still, 30% of projects are under water at \$75 a barrel, leading to \$76 billion in deferred projects.
- Shakeout occurring in Canadian oil sands: Two firms, Southern Pacific and Ivanhoe Energy, have declared bankruptcy and five major projects have been cancelled.
- Future oil sands breakeven costs for new development > \$50 a bbl breakeven, with major expansion projects like Kearl estimated at \$90 to \$95 a barrel breakevens. Majors reporting that new projects are not currently economic.

# Breakevens for US shale oil and gas are lower than many other regions and will test new economics.

#### Arctic and Mega-LNG projects could be most under pressure as global gas

prices ease.

Field	Breakeven at June 2015	OPEX
Marcellus (gas)	\$2.00-2.50	\$1.00
Barnett (gas)	\$3.25-3.80	\$1.80
Haynesville (gas)	\$3.00-3.60	\$1.80
Eagle Ford (oil)	Was \$37, now \$27	\$7-\$8
Permian (oil)	Was \$49, now \$39	\$10-\$12
Bakken (oil)	Was \$37, now \$27	\$7-\$8
Mississippian	Was \$43, now \$33	\$7-\$8 Source: Citi Research

### Oil price collapse has geopolitical element

- Saudi price war accelerated downward cyclical trend
- Falling oil prices and escalating conflict over Syria coming to a head
- Conflict resolution, if successful, could create a shift in OPEC strategy but Russia playing a spoiler role despite promising Iranian-US-Saudi diplomacy



## **ISIS Setting Fire to Oil Fields and Refineries**

- Over 1.9 million b/d of oil production currently disrupted by wars in Libya, Yemen, Syria and eastern Iraq
- ISIS military operations and technical ineptitude has destroyed over 90,000 b/d of Mideast productive capacity to date
- Syria Al-Furat, Yemen, smaller, eastern Iraqi fields, Ghani field in Libya all affected
- ISIS has announced it is targeting Saudi regime



### 2 to 5 Year Horizon: Possible Supply Gap Depending on Trends in Saudi, Iraq and Iran

- ISIS military campaigns damaging facilities
- Regime change in Mideast destabilizing oil industries
- Russia struggling against loss in access to foreign capital
- Venezuelan industry pressed by low oil prices
- Major oil sands cancellations, Canada seeking to diversify economy
- Arctic drilling delays, majors slashing mega project budgets
- US shale will bump up against constraints unless export ban is lifted.

### 10 to 20 Year Horizon: Could we see peak demand?

- Millennial urbanization trend & sharing economy
- End of non-OECD subsidies removing a prop to demand
- China slowdown is structural
- Renewables, advanced vehicles continue to gain ground
- Waste to energy and other elements of circular economy movement will lower demand in manufacturing, buildings, freight



### Transformational Disrupters: Societal Shift Towards the "End of Oil"?

 Future holds many potential transformational trends, including greenhouse gas regulations, technology innovation and geopolitical, price upheavals. Companies must position themselves for new more adaptive business models.

