

AAPG Geoscientist Survey Results

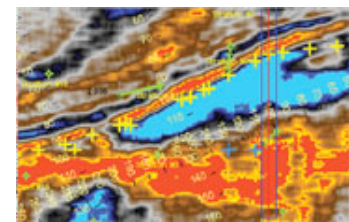
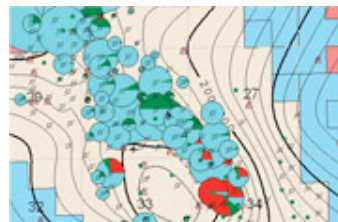
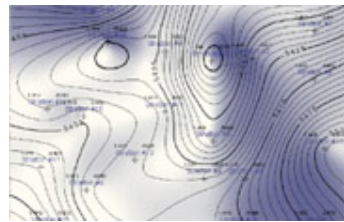
Geoscientists perspectives on the future of energy

Contents:

- Overview of results.....Slide 2
- Demographics.....Slide 3
- Peak Oil.....Slide 4
- Oil Prices.....Slide 5
- Alternative Fuel.....Slide 6
- Conclusions.....Slide 7

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Overview Of Results

- Geoscientists see increasing fuel prices in the years ahead.
 - A majority see prices above \$150/barrel in 2013
- Total sample sees Peak Oil occurring in less than 10 years
 - One third sees it occurring in less than 5 years
- Despite this, geoscientists still believe Hydrocarbons will remain the primary source of energy, by far, in 2033.
 - Among alternatives, nuclear is seen as the most prolific in that time span.

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Demographics

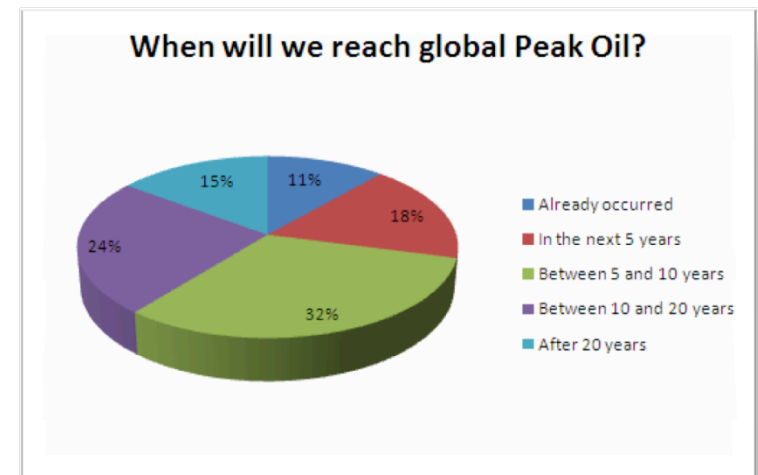
- Survey conducted at AAPG Yearly Conference in San Antonio on April 22nd 2008
 - AAPG is the American Association Petroleum Geologists – though name says “American”, it is international and the largest petroleum scientist organization in the world with 34,000 members (33% from outside of USA)
- Survey had 150 respondents from AAPG members
 - 46% are 45 yrs or older, the rest under 45
 - 60% of respondents were from North America

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Geoscientists Predict Global Peak Oil by 2018

- 61% sees global proven reserves beginning to decline within 10 years
 - Among geoscience managers, this number increases to 74%
 - And almost one third overall sees Peak Oil within 5 years
- Among current hot prospects, only Deepwater Brazil and Canadian Oil Sands are seen by a majority as having a potential of >5 billion barrels of new discoveries



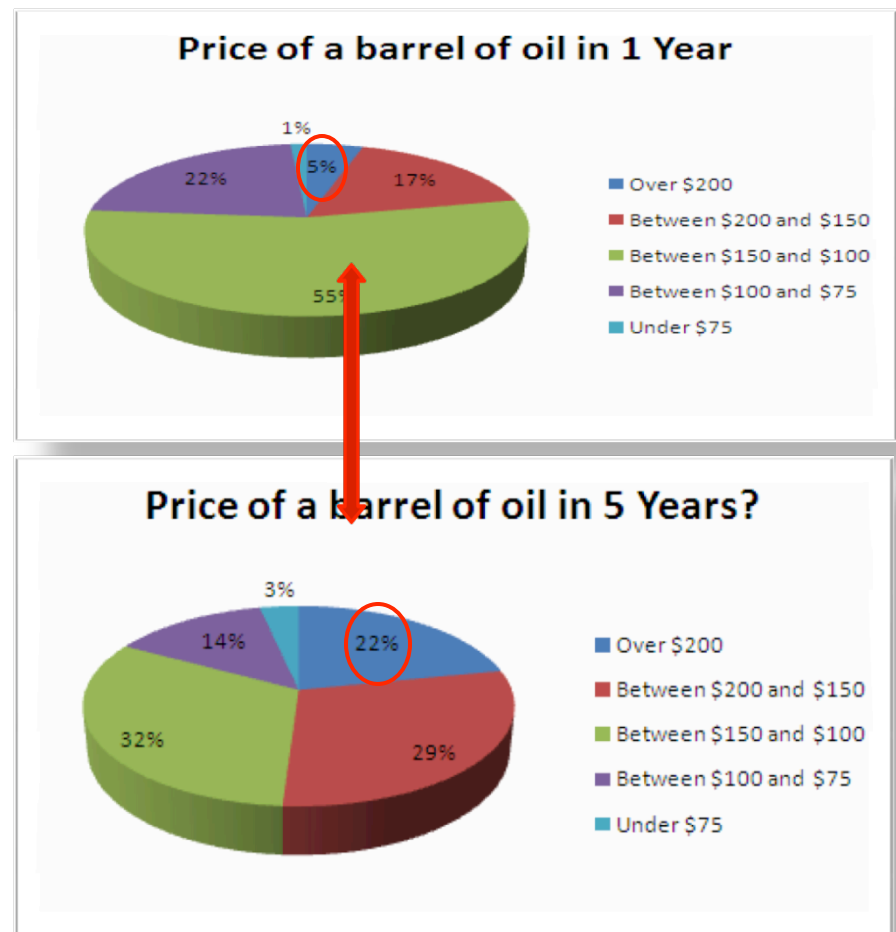
Best Oppty for New Super Giant Fields	Rank
Deepwater Brazil	65%
Canadian Oil Sands	58%
Alaska	48%
Deepwater West Africa	46%
Deepwater Gulf of Mexico	46%
China	38%
Unconventional Sources in USA	24%
India	14%

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Geoscientists See Oil Prices still >\$150 in 2013

- A majority see oil prices over \$150/barrel in 2013
 - While only 5% see >\$200 in 2009, **22% forecast \$150 price in 2013**
 - Of respondents in management, only 7% of mgmt see prices >\$200 in 2013



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Nuclear Seen As Key Alternative Fuel In 25 Years

- 76% still see fossil fuels as primary energy source in 2033
 - But only 13% see fossil fuels comprising more than 80% of consumption.
 - This represents an expectation of decline for fossil fuels given that they currently represent 85% of consumption.
- Nuclear is the next best candidate, seen by 36% as a primary energy source in 2033
 - While few see nuclear as a dominant source, few also consider it a marginal source
 - Currently only 6% of global consumption is nuclear
- Pluralities see Solar and Wind still accounting for <10% in 2033

Energy Source	AMT >80%	80% > AMT > 40%	40% > AMT > 10%	AMT <10%
Fossil Fuel	13%	63%	24%	0%
Solar	10%	10%	39%	42%
Biofuels	9%	25%	36%	30%
Wind	8%	13%	33%	46%
Nuclear	3%	33%	53%	11%
Hydrothermal	2%	20%	39%	38%

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Conclusions

- Petroleum Geoscientists, who arguably have the most insight on global oil prospects, are doubtful about supply and prices, both in the short term, and in the longer term
- In addition, they question whether non fossil fuel sources can offset hydrocarbon use, even in 25 year time frames
 - However, nuclear technology presents a silver lining to the alternative energy story in the minds of geoscientists.

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