



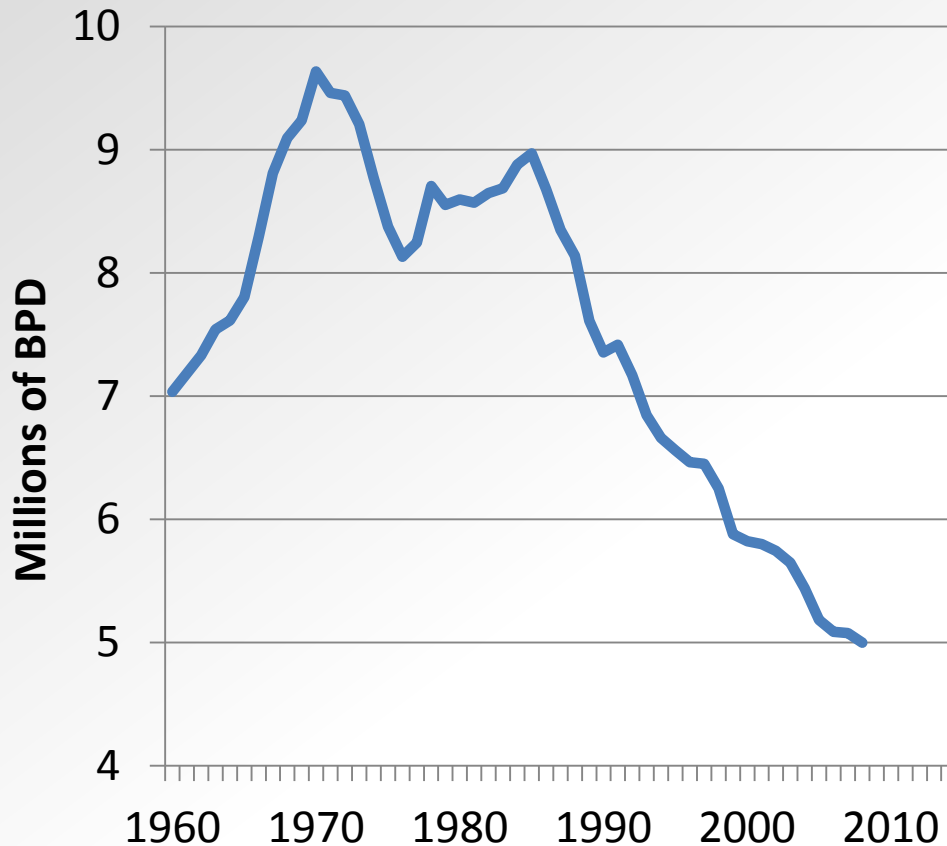
# Rebalancing Global Crude Flows

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AICHE Technology Conference  
Galveston, Texas  
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# Annual U.S. Crude Production

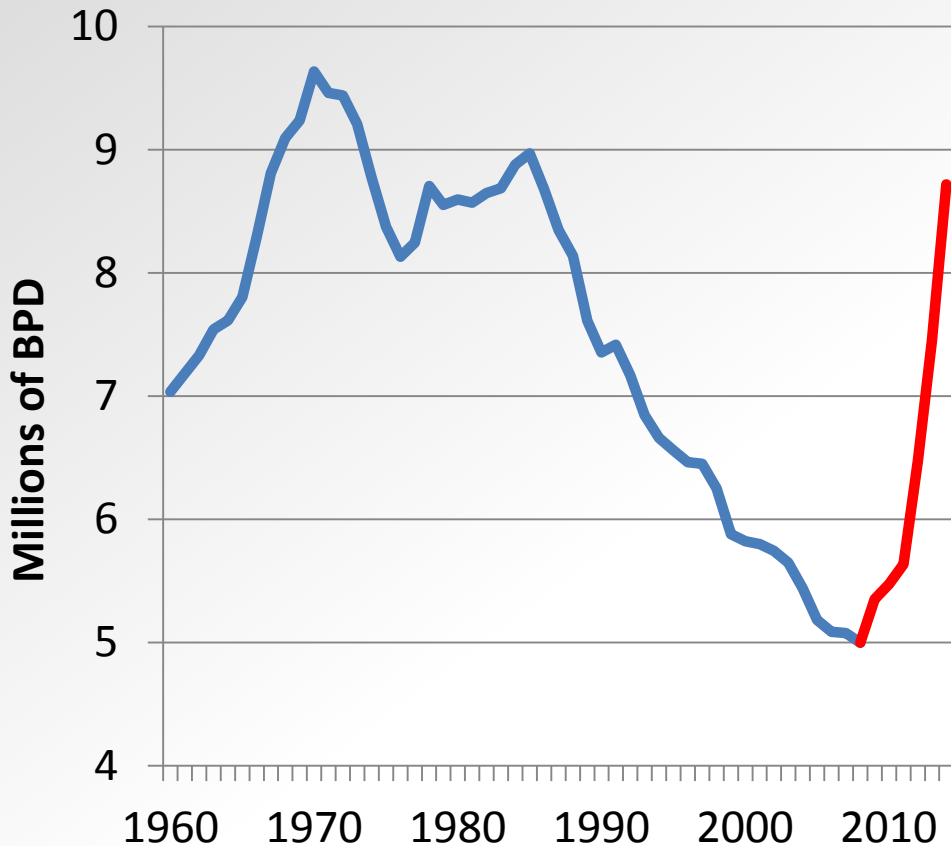


Source: EIA

- U.S. crude oil production has been declining since 1985
- Output peaked in November of 1970 at 10.0 million BPD
- Output in 2008 fell to 5.0 million BPD



# U.S. Crude Production

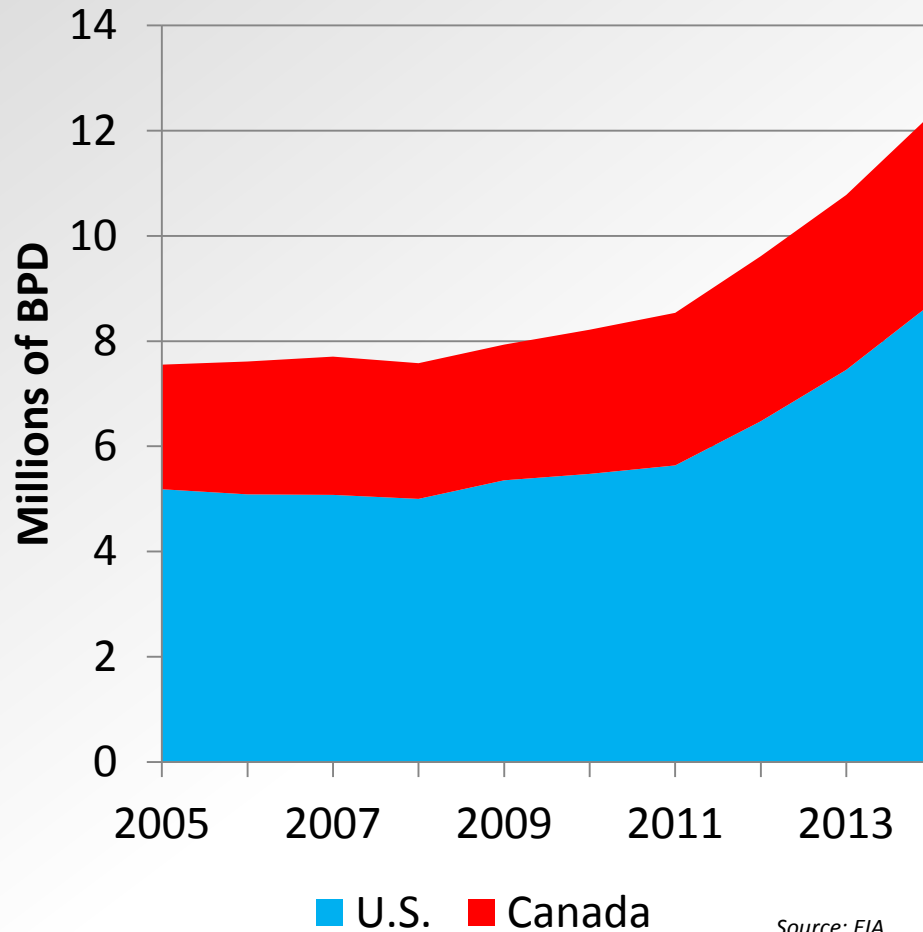


Source: EIA

- U.S. crude oil production rose to 8.7 million BPD in 2014
- Estimated output in 2015 is 9.3 million BPD
- Recent high output was 9.6 million BPD in April

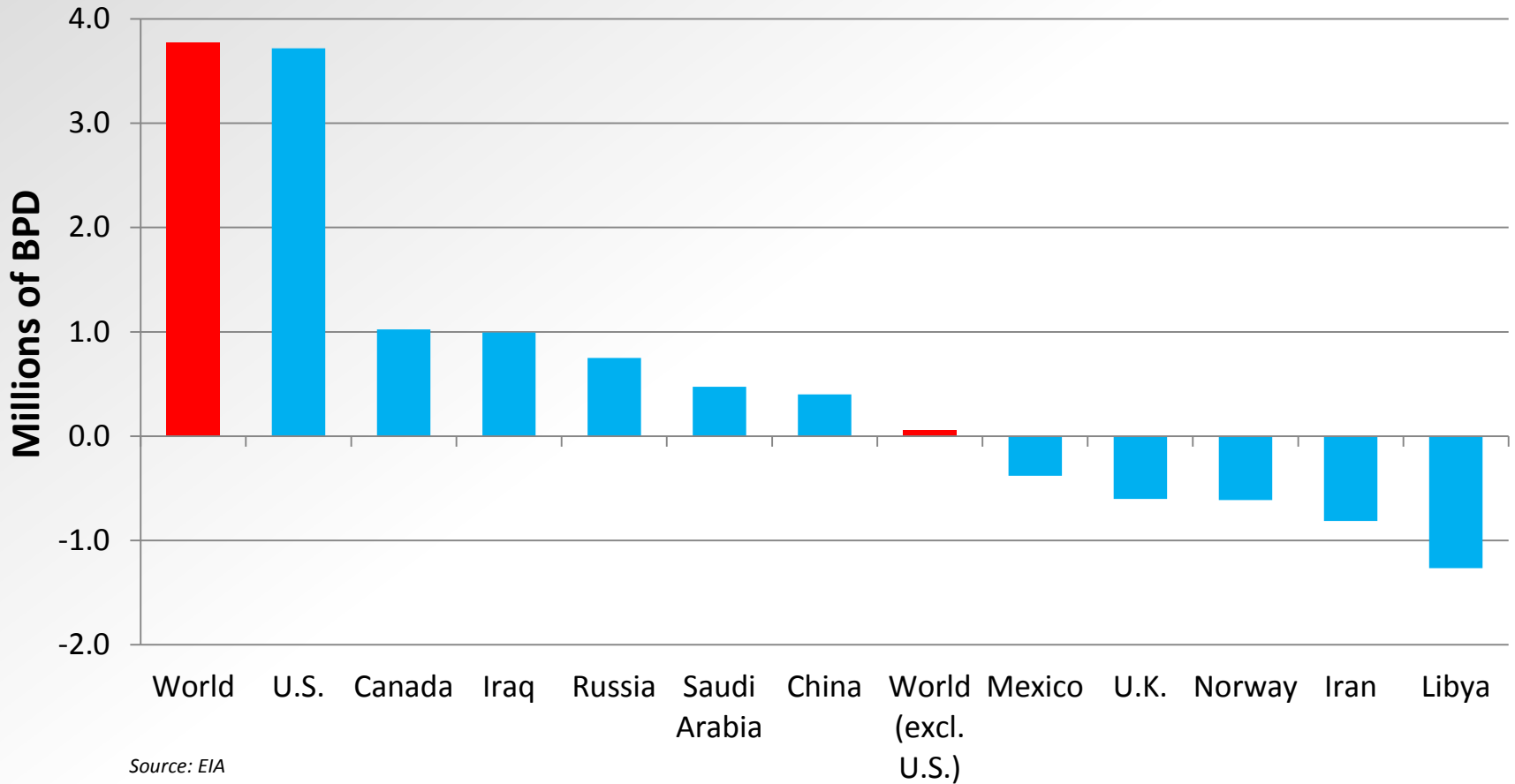


# North American Production Gains



- U.S. crude oil production grew by 3.7 million BPD between 2008 and 2014
- The U.S. had its greatest oil growth in 2014 at 1.3 million BPD
- Canadian production grew by 1.0 million BPD between 2008 and 2014

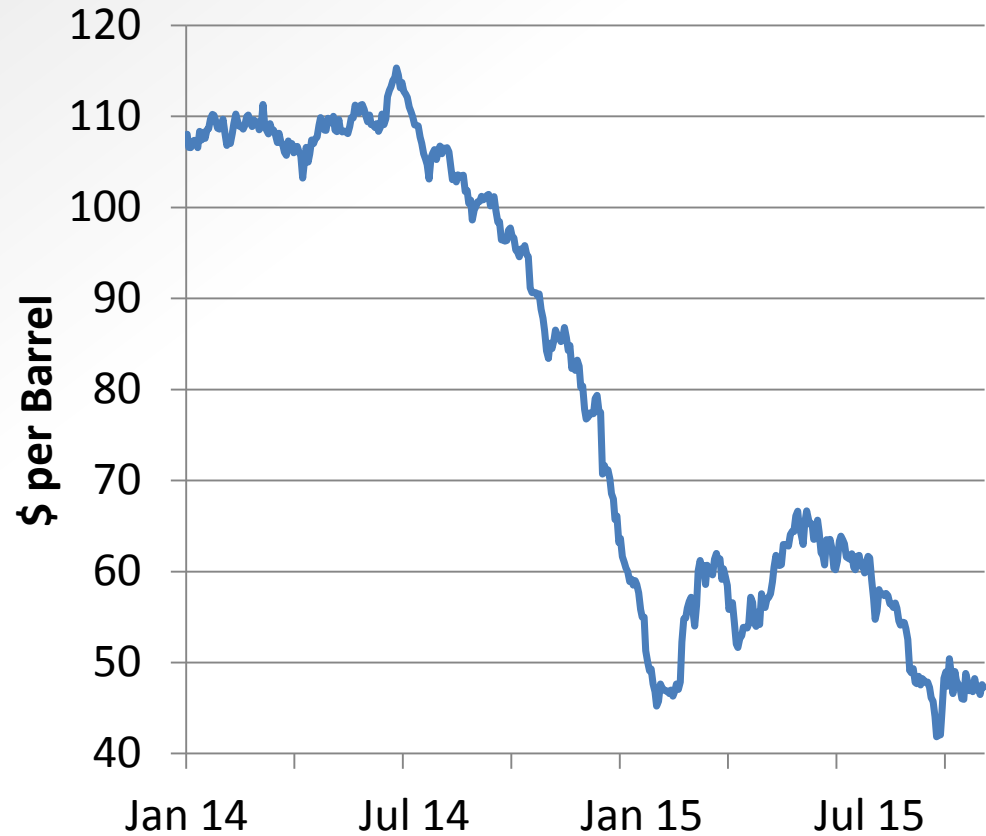
# Global Crude Production Growth from 2008 - 2014





# Brent Prices Are Sharply Lower

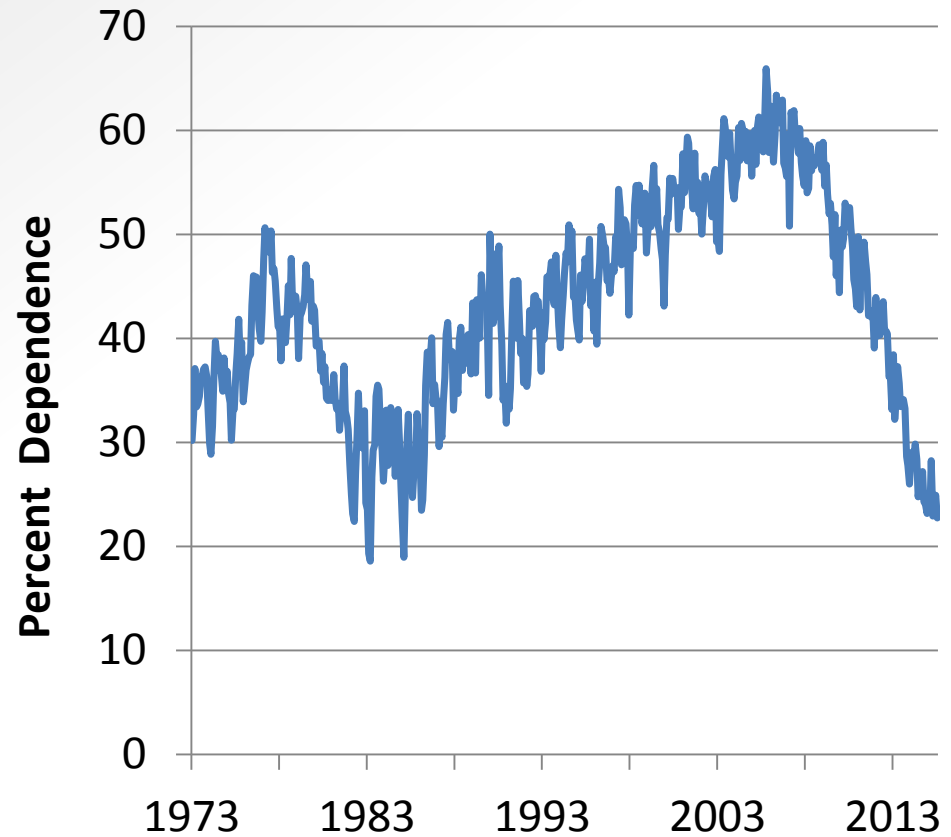
- Brent prices peaked in June of 2015 at \$115.32
- Prices hit recent lows in Jan and August of 2015
- Brent had yearly lows in 4Q in 2008 and 2014



# U.S. Dependence on Foreign Oil



- U.S. dependency peaked in 2005-2007 at more than 60%
- Dependency has recently fallen below 23%
- Decline a result of U.S. production, renewable fuels and moderating demand

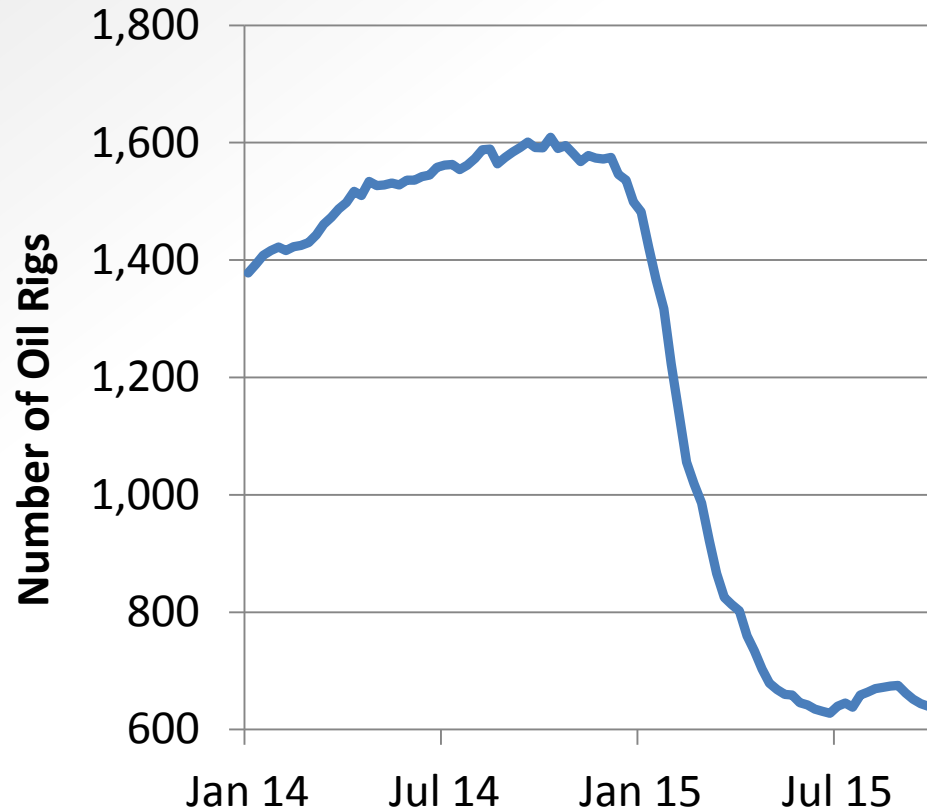


Source: EIA



# U.S. Oil Rig Count Also Down

- Oil rig count peaked in October of 2014 at 1,609
- Rig count bottomed out in June of 2015 at 628
- Recent rebound has faltered



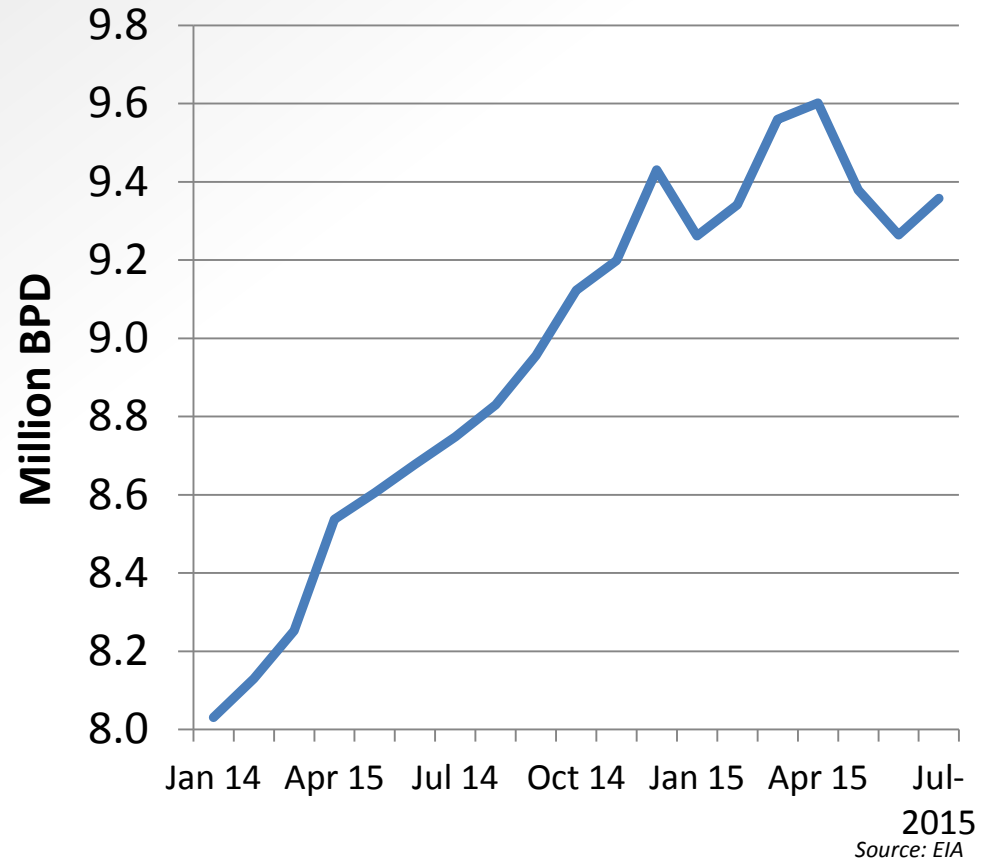
Source: Baker Hughes





# 2015 U.S. Crude Production

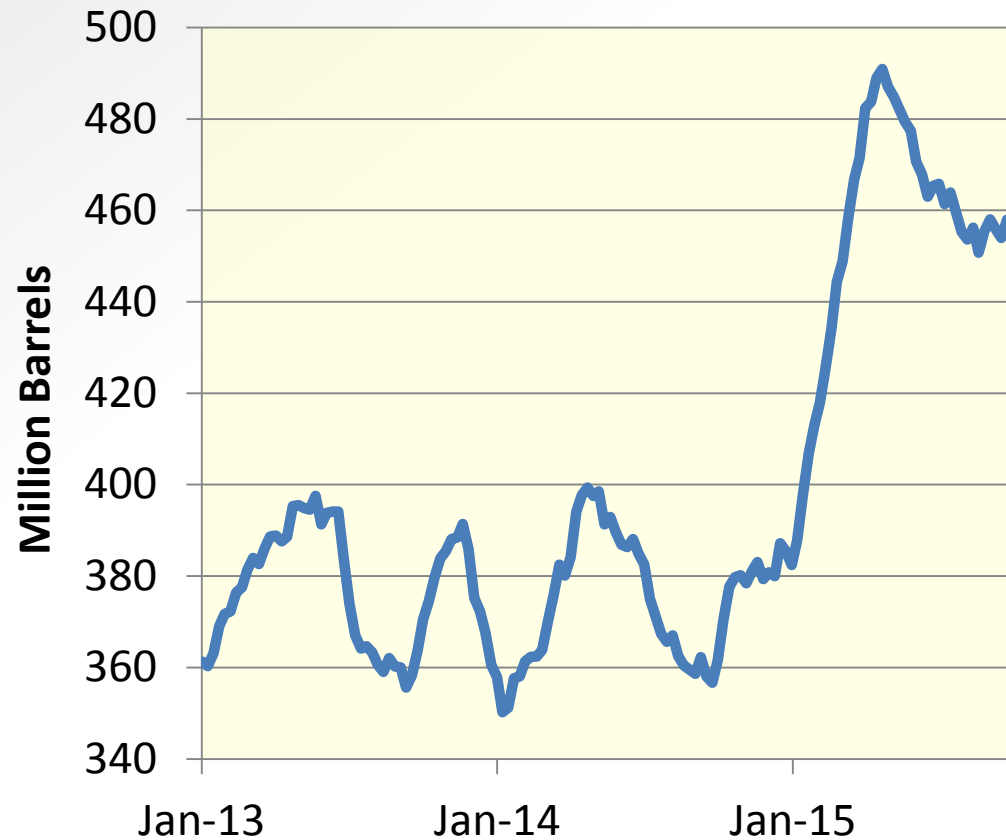
- Production has declined in recent months
- Output is lower by 243 MBPD from the April peak
- Current production is 639 MBPD above the 2014 average





# U.S. Crude Inventory (Excluding SPR)

- U.S. crude inventories rose by over 100 million barrels in the last year
- Inventories have moderated in recent months

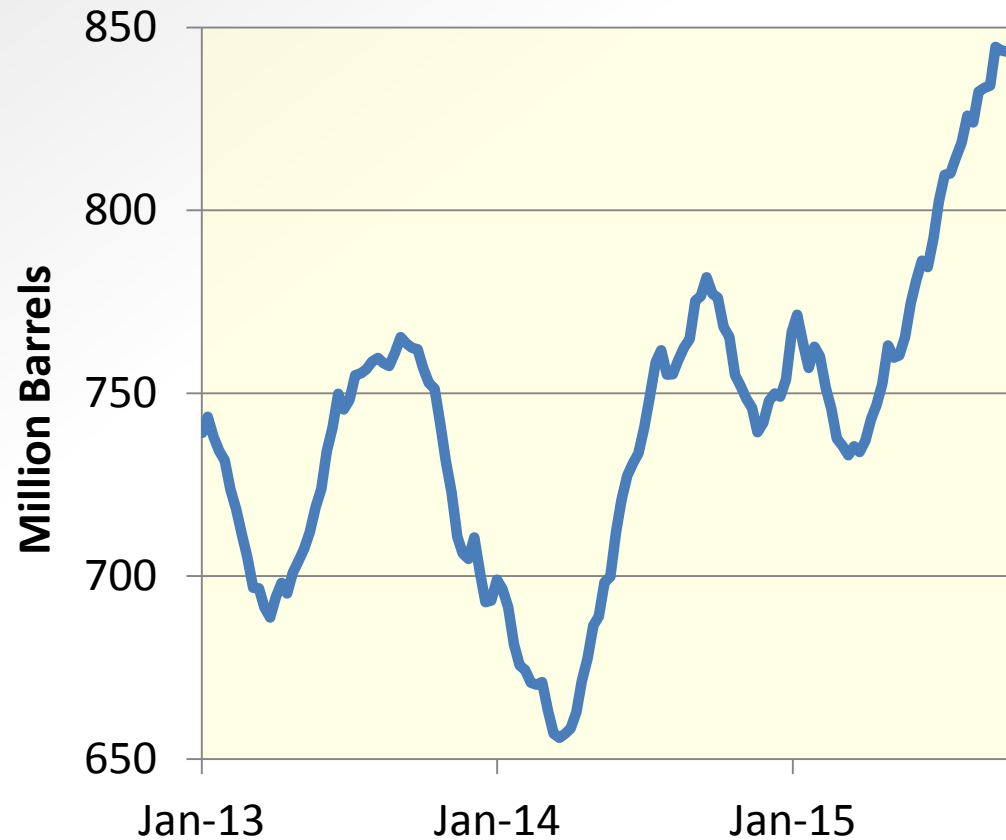


Source: EIA



# U.S. Product Inventories (Including Intermediates)

- U.S. product inventories have risen by over 110 million barrels since March
- Stocks have jumped by 187 million barrels since March of 2014

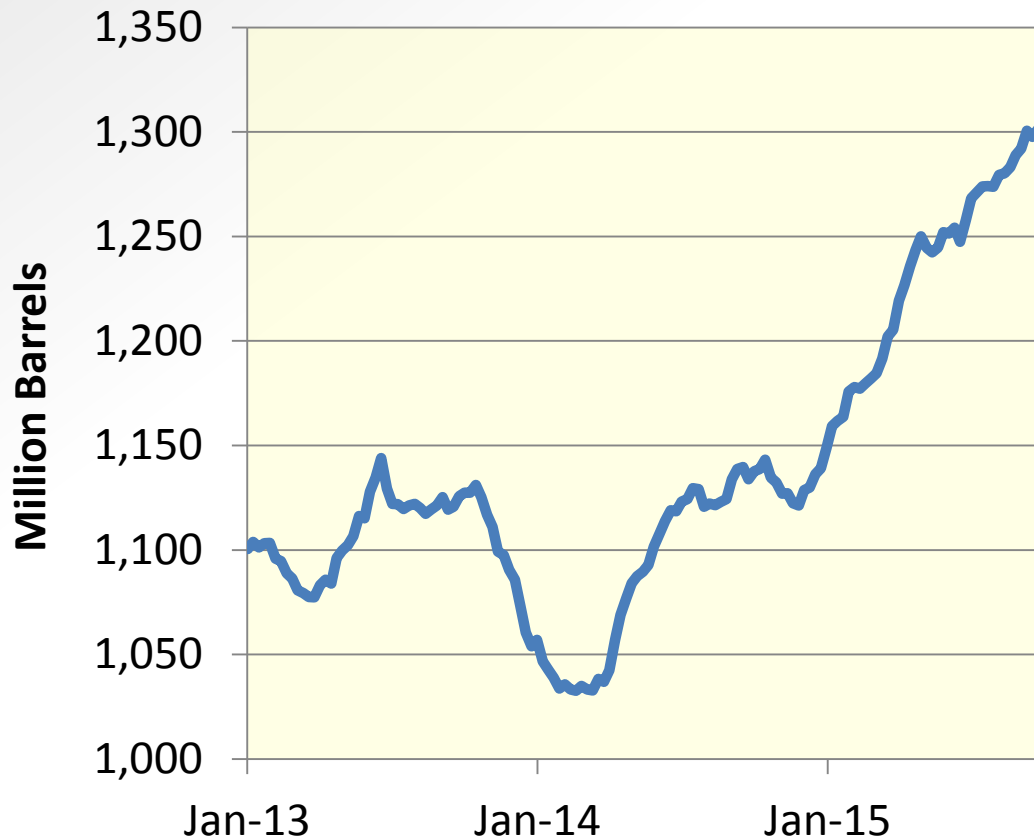


Source: EIA



# U.S. Crude & Product Inventories (Excluding SPR)

- Total oil stocks have risen by 269 million barrels since early 2014
- The stock build is at a rate of 462 MBPD

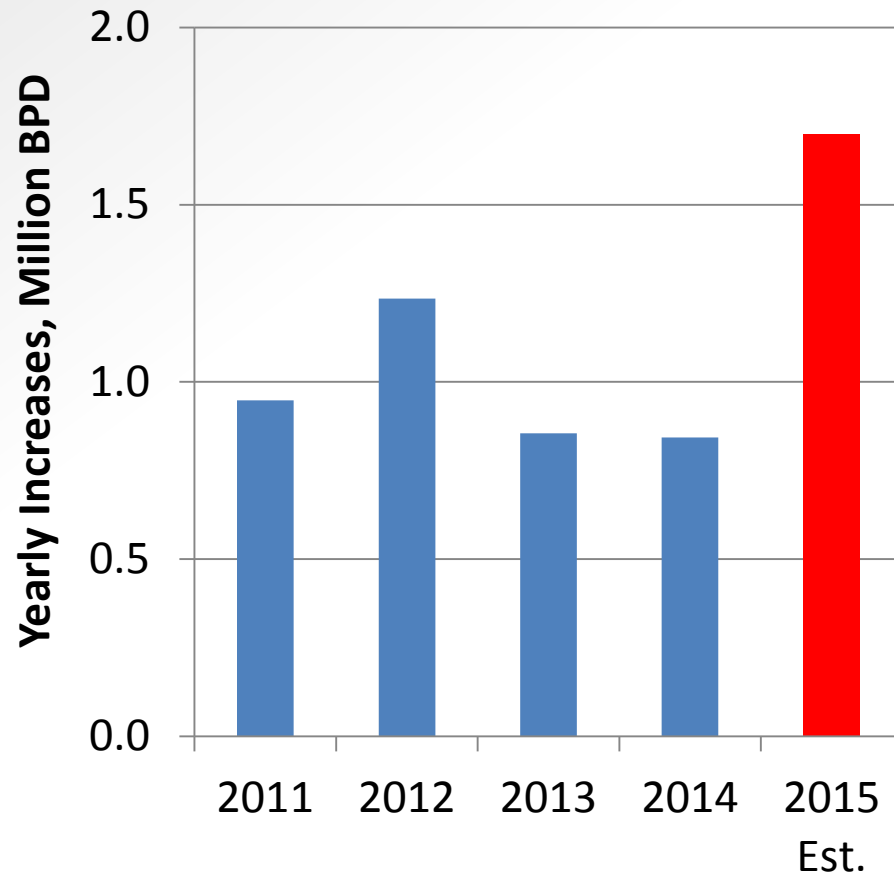


Source: EIA



# Global Demand is Rising

- IEA projects 2015 demand growth at 1.7 million BPD
- 2015 to have the strongest growth since 2010

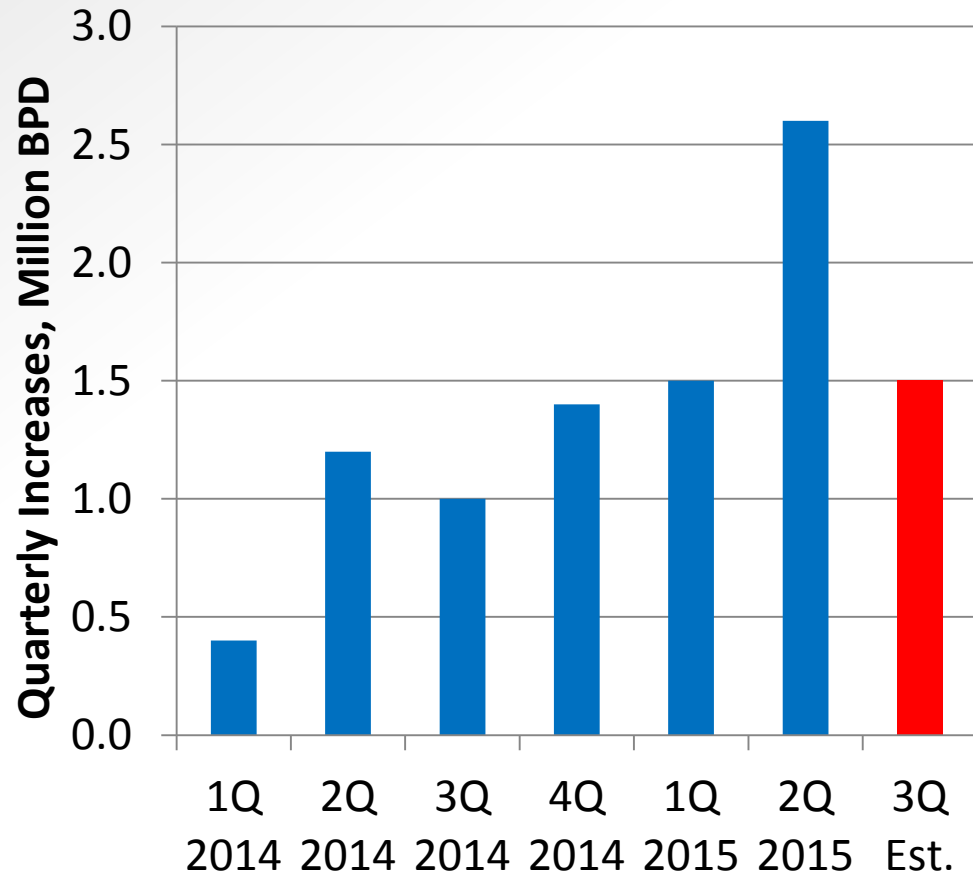


Source: IEA and EIA



# The Growing Crude Oil Glut

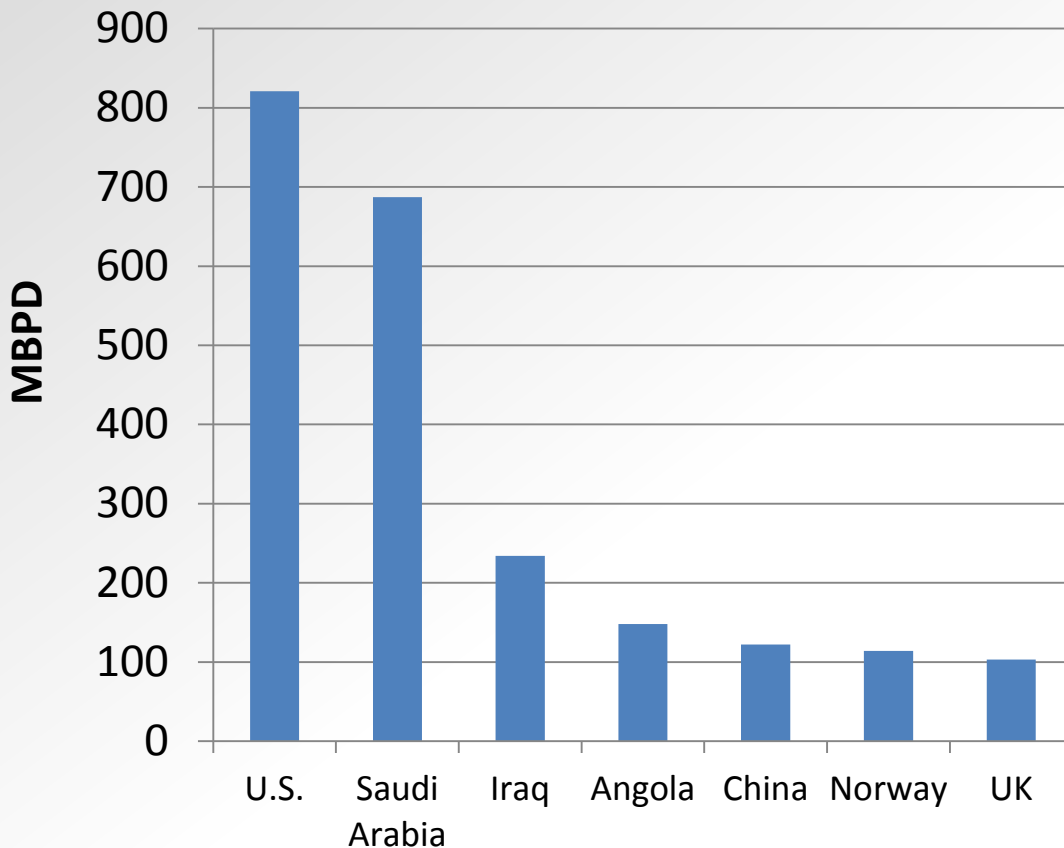
- IEA calculates oil stocks have risen since 1Q2014
- 2Q2015 build is the greatest at 2.6 million BPD
- The total build in 2014 and YTD 2015 is 875 million barrels



Source: IEA



# Change In Crude Production 2Q2014 vs 2Q2015



Source: EIA and JODI

- Many countries are attempting to maximize revenues
- U.S. has greatest growth at 821 MBPD
- Saudi Arabia has increase production by 687 MBPD



# New Oil World Order

- The “New Oil World Order” is a multi-client study which calculates future Brent prices based on the convergence of crude oil supply and demand
- Production costs were evaluated for 45 regions
- Model is an iterative process which computes production rates in balance with crude demand
- Current Brent price would be in low \$60s if supply were in balance with demand



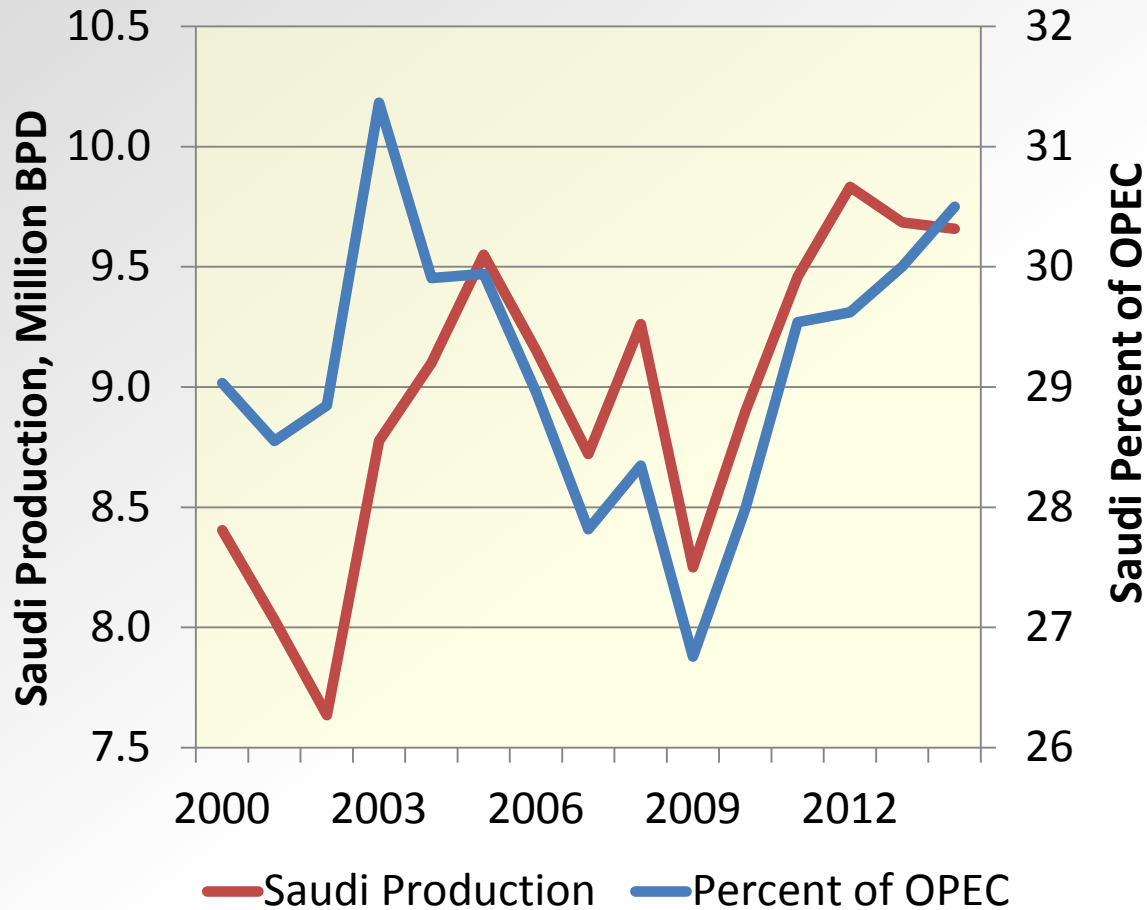


# Inventory Solution Scenarios

- Political event which would reduce global output
- OPEC production reductions
- Wait until global demand increases to above crude supply



# Recent Saudi Production Levels



Source: EIA

- Low of 7.6 million BPD in 2002 and a high of 9.8 million BPD in 2012
- Saudi market share of OPEC at low in 2009 at 26.8% and a higher in 2014 at 30.5%



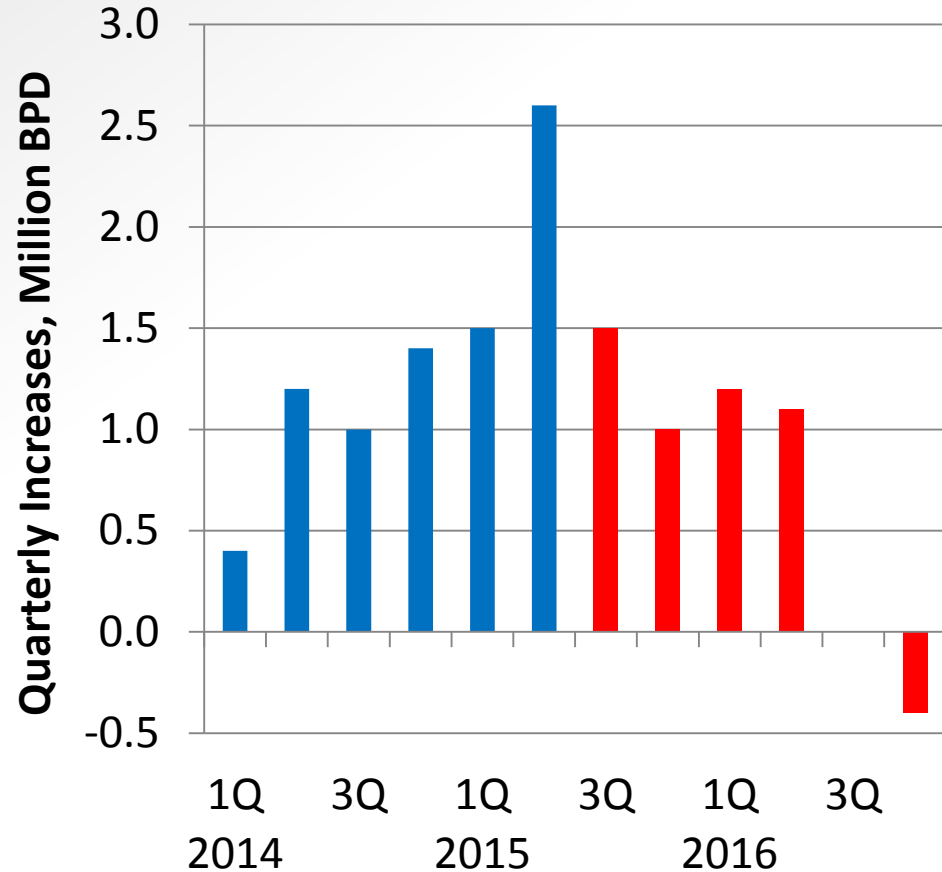
# OPEC Crude Production 1980 - 1985

	Production MBPD		Decline MBPD	
	<u>1980</u>	<u>1985</u>	<u>MBPD</u>	<u>Percent</u>
Saudi Arabia	9,900	3,388	6,512	66
Other OPEC	<u>15,483</u>	<u>11,979</u>	<u>3,504</u>	23
	25,383	15,367	10,016	
<i>Source: EIA</i>				



# The Long Road to a Supply/Demand Balance

- IEA projects oil stocks to increase through 3Q2016
- Total oil build will be over 1.2 billion barrels
- Forecast is based on OPEC output of 31.7 million BPD



Source: IEA



# Conclusions

- The U.S. has been the dominant source of incremental crude since 2008
- Surplus crude production has forced sharply lower crude prices
- OPEC (Saudi Arabia) has sought to defend its market share rather than crude prices
- OPEC (Saudi Arabia) is not likely to set output quotas in 2015
- Prospects for a broader production agreement in 2016 are declining

# Conclusions (cont.)



- Many producing nations have increased output to minimize revenue losses
- Rising crude and product inventories will continue to depress prices
- The IEA is forecasting inventory builds until 3Q2016
- Surplus oil stocks will reach 1.2 billion barrels by mid-2016
- Barring a political event, a sustained price recovery is not likely before 2H2016

# Conclusions (cont.)



- Brent prices in a balanced supply and demand market are in the low \$60s

# Presenter



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