1. Lower oil prices will NOT lead to higher gas prices – they will lead to lower gas prices

2. Marcellus/Utica gas will not make it either to Miami or Tokyo, but it will heat Chicago
   a. Western Canada is totally hosed
   b. The Rockies are slightly less hosed

3. US LNG will STILL get lifted with cheap oil, but new projects will have difficulty signing contracts
CHEAP OIL = CHEAP GAS
ECONOMICS 101

Price

Quantity

Source: Bloomberg New Energy Finance  Note: Includes basis from Henry Hub; does not include land costs.
SUPPLY SHOCK (IE, LOSS OF ASSOCIATED GAS PRODUCTION) = HIGHER PRICES

BUT…

Source: Bloomberg New Energy Finance   Note: Includes basis from Henry Hub; does not include land costs.
THE WORLD HASN’T MOVED IN STRAIGHT LINES FOR A LONG TIME
MORE REALISTIC NORTH AMERICAN GAS SUPPLY STACK

Breakeven Henry Hub price ($/MMBtu)

- Associated gas production
- Legacy production (zero cost)
- Superlative gas resources
- Baseload gas resources
- Economically marginal gas resources

Potential production volume (Bcfd)

Source: Bloomberg New Energy Finance
MORE REALISTIC NORTH AMERICAN GAS SUPPLY STACK

Breakeven Henry Hub price ($/MMBtu)

Potential production volume (Bcfd)

Source: Bloomberg New Energy Finance
WHAT IS A BREAKEVEN PRICE?

Breakeven price is when NPV = 0 at some pre-specified discount rate. IT’S A RANGE, NOT A NUMBER!

Cash flow = hydrocarbon sales net after royalties (NAR), lease operating expenses (LOE) and taxes, with a nice kick upfront from the intangible drilling (& completion) cost deduction (IDC)

Drilling and completion costs represent the bulk of total spend

Source: Bloomberg New Energy Finance
GAS BREAKEVEN PRICING BY PLAY ($/MMBTU HENRY HUB)

As of December 2014 using a 20% discount rate

Source: Bloomberg New Energy Finance   Note: Includes basis from Henry Hub; does not include land costs.
GAS BREAKEVEN PRICING BY PLAY
($/MMBTU HENRY HUB)

Our forecast of May 2015 – 15% discount rate and 20% lower D&C

The combination of lower D&C and a less generous return knocks $0.90/MMBtu off the cost of gas supply.

Source: Bloomberg New Energy Finance  Note: Includes basis from Henry Hub; does not include land costs.
OFS IS A MARKET WITHIN A MARKET

After the Gold Rush, pickaxes could be gotten on the cheap

Source: Bloomberg New Energy Finance
OIL BREAKEVEN PRICING BY PLAY
($/BBL WTI)

Our forecast of May 2015 – 15% discount rate and 20% lower D&C

The combination of lower D&C and a less generous return knocks $15/bbl off the cost of oil supply.

Source: Bloomberg New Energy Finance   Note: Includes transport costs; does not include land costs.
MARCELLUS MOLECULES WON’T MAKE IT TO MIAMI (OR TOKYO)
APPALACHIAN BASIN PRODUCTION AND TAKEAWAY CAPACITY FORECAST (BCFD)

Production forecast

Excess capacity from all projects

Capacity from most viable projects

30Bcfd

Source: Bloomberg New Energy Finance
US ‘RING’ REGIONS

Source: Bloomberg New Energy Finance  Note: ‘Ring’ region definitions are our own.
YES, CONSUMPTION IS EXTREMELY SEASONAL…

Eastern US gas consumption by ring region (Bcf/d)

- Ring 4
- Ring 3
- Ring 2
- Ring 1

Houston, October 2014
...BUT NOT IF YOU INCLUDE NET STORAGE INJECTIONS (USUALLY)

Eastern US gas consumption + net storage injections (Bcf/d)

*Entire Eastern US, ie Rings 1-4

Houston, October 2014
THE EASTERN US (RINGS 1-4) CONSUMES A BIT MORE THAN 30BCFD

Eastern US gas consumption + net storage injections (Bcfd)

*Entire Eastern US, ie Rings 1-4

12-month moving average

Monthly actuals
WE SEE THIS GROWING CLOSER TO 40BCFD BY 2020

Eastern US gas consumption + net storage injections (Bcf/d)
*Entire Eastern US, ie Rings 1-4

Total annual demand by region (Bcf/d)

12-month moving average

Monthly actuals
BUT IS THE APP BASIN GONNA PUMP 40+BCFD?  
(NO.)

Houston, October 2014

Source: Bloomberg New Energy Finance  
Note: ‘Ring’ region definitions are our own.
BUT IS THE APP BASIN GONNA PUMP ~30BCFD? (YES.)

Houston, October 2014

Total annual demand by region (Bcfd)

Source: Bloomberg New Energy Finance   Note: 'Ring' region definitions are our own.
BUT IS THE APP BASIN GONNA PUMP ~30BCFD? (YES.)

Houston, October 2014

Source: Bloomberg New Energy Finance   Note: 'Ring' region definitions are our own.
Source: Bloomberg New Energy Finance. Note: Red arrows denote decrease in flows while green arrows denote increase in flows. Arrows show direction of physical flows. Only major changes are shown.
US LNG WILL STILL (JUST) GET LIFTED
US LNG is less expensive than Australian LNG when including capex (sunk costs). But more expensive on a short-run marginal cost basis.
AT WHAT OIL PRICE IS US LNG COMPETITIVE?
SHORT-RUN BASIS

Delivered price of LNG ($/MMBtu)

At a "typical" link of 14%, $4 Henry Hub remains competitive above $53/bbl

Above $70/bbl, US LNG looks competitive even at $5/MMBtu

Delivered cost of oil-linked LNG at slope of:

- 15%
- 12%

Delivered cost of US LNG at Henry Hub price of:

- $5/MMBtu
- $4/MMBtu
- $3/MMBtu

Source: Bloomberg New Energy Finance
AT WHAT OIL PRICE IS US LNG COMPETITIVE? LONG-RUN BASIS

Delivered price of LNG ($/MMBtu)

At a "typical" link of 14% and a $4 Henry Hub outlook, signing a long-term contract for US LNG is a bet on $70+/bbl oil

Source: Bloomberg New Energy Finance
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