

*FLAME 2019*

# What may Europe expect from developments in the major U.S. shale gas and oil plays?

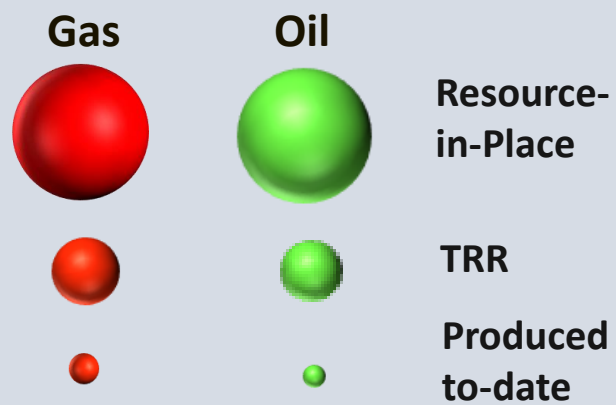
by

Svetlana Ikonnikova

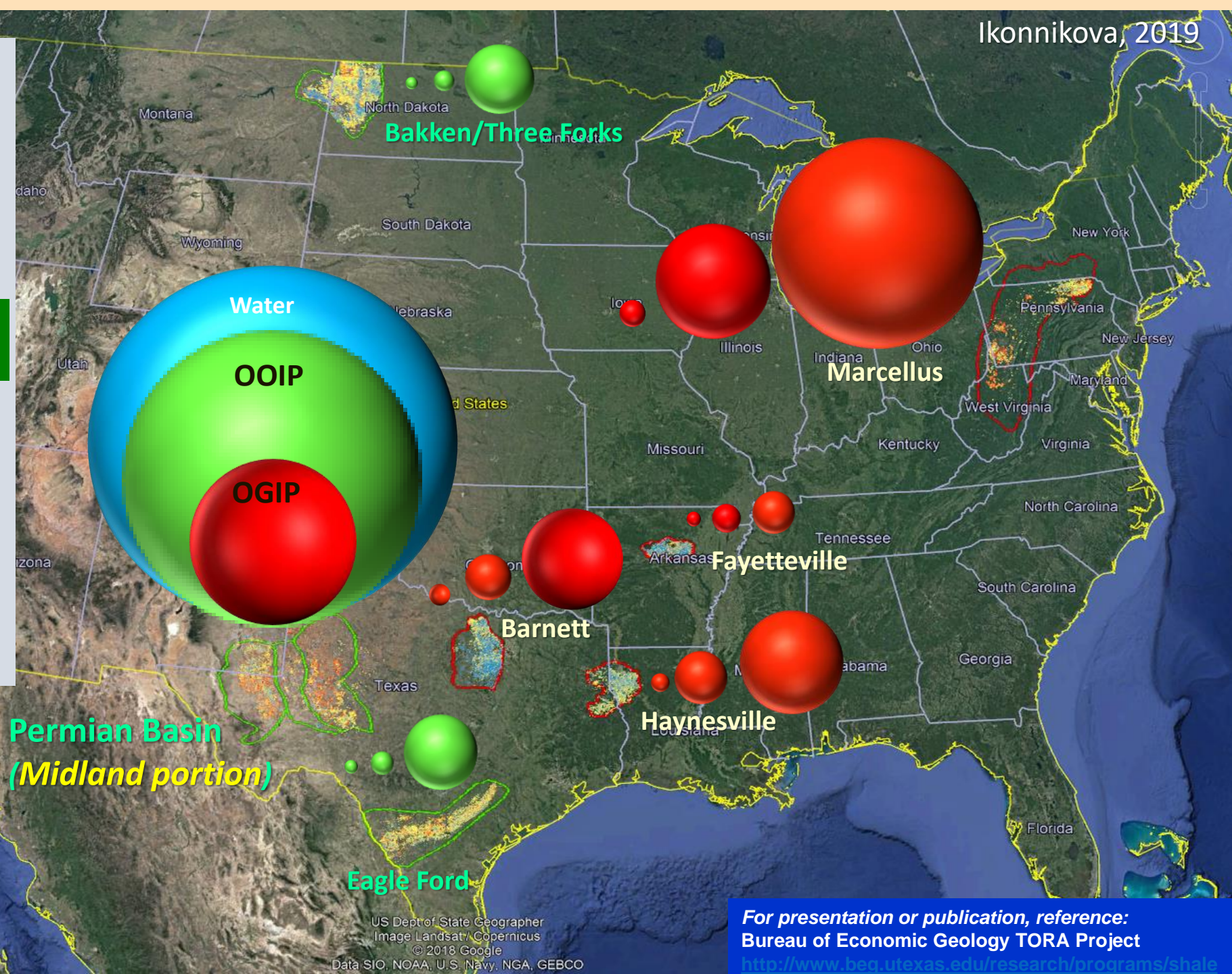
**How**  
***Unconventional Resource in the U.S.***  
**looks on the first sight**



	<u>Gas</u>	<u>Oil</u>
<i>(excl. Permian)</i>	<i>Tcf</i>	<i>Bbbl</i>
Original In-Place	3150	450
Tech. Recoverable	~25%	<10%
Production to date	<5%	<2%
Horizontal wells to date	~100,000	
Potential future wells	~500,000	



Completion Year

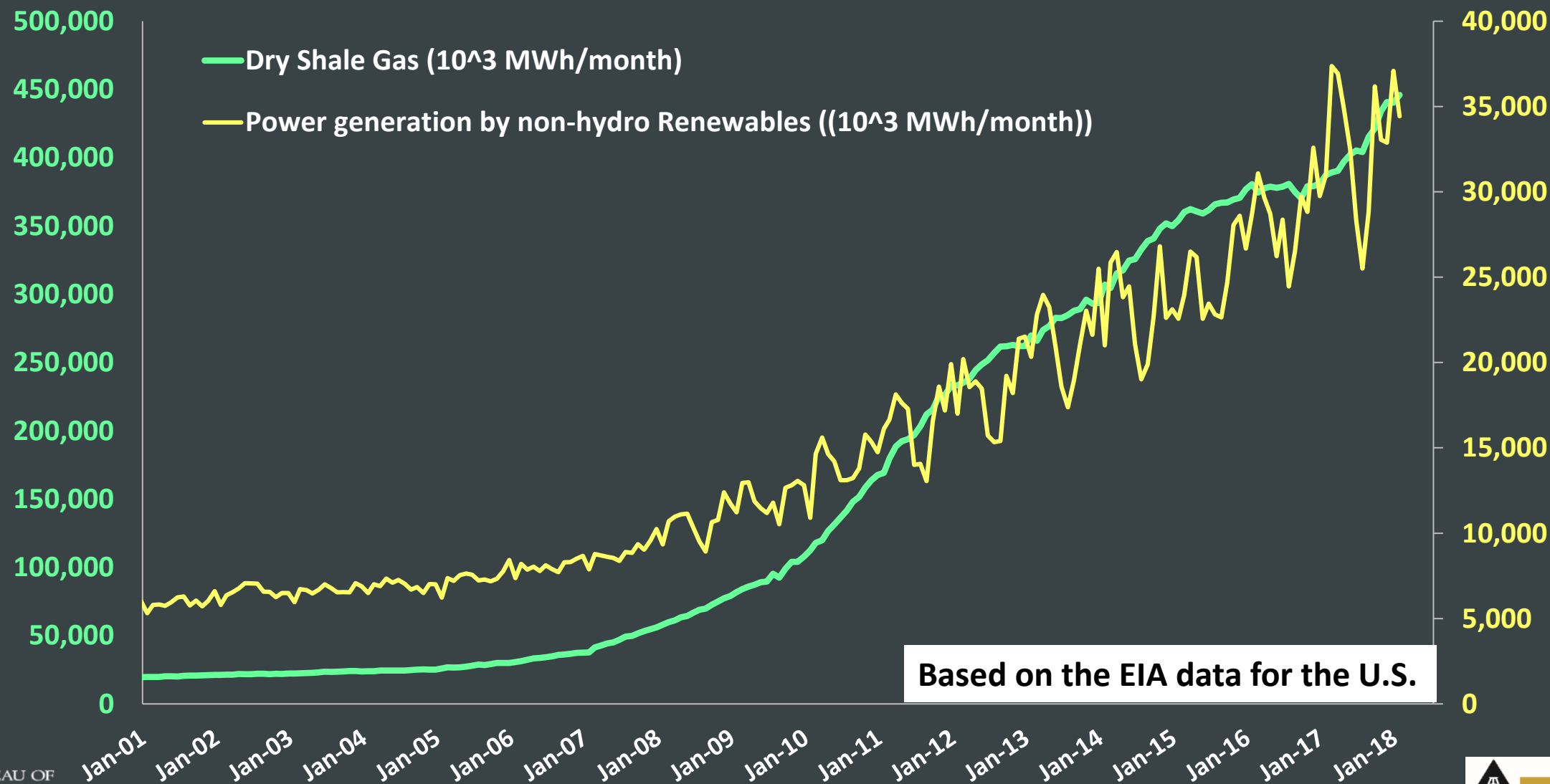


For presentation or publication, reference:  
Bureau of Economic Geology TORA Project

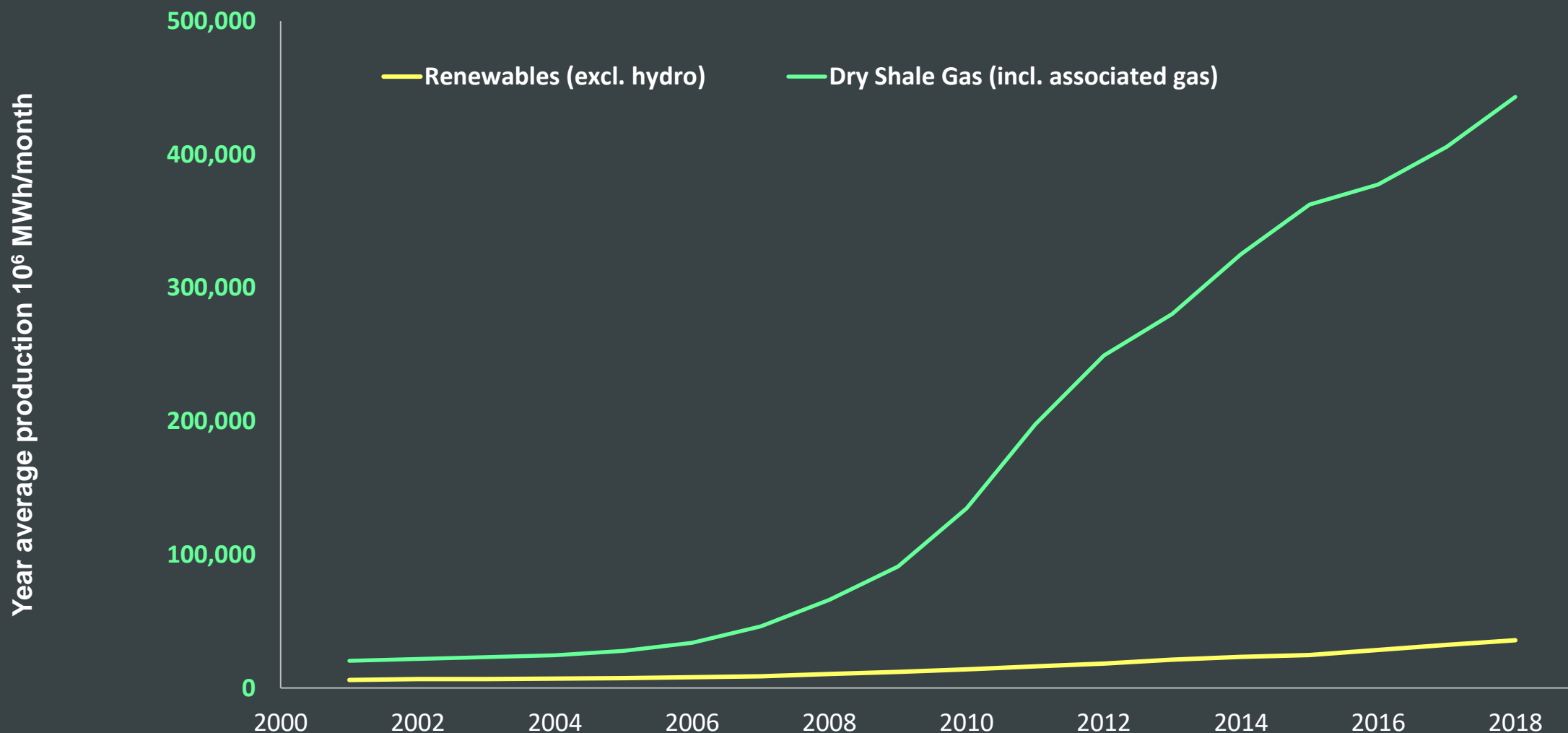
<http://www.beq.utexas.edu/research/programs/shale>



# Speaking of Exponential Growth



# Closer Look: Year averages on the Same Scale



# **Spoiler Alert!**

## ***Conclusions***

# Major Observations and Conclusions

- Major outlooks agree: in the next 3-5 years U.S. production will grow and international markets will play increasing role since the domestic market is saturated;
- After 2025, increasing uncertainty about supply and price fluctuations: post 2030 many plays are likely to decline running out of economical locations;
- Expectations regarding the decline will slow down investments in infrastructure;
- The future is complicated by the changing relationship between energy prices and natural gas supply: oil and NGL prices playing increasing role;
  - In 2010-2014,  $\geq 70\%$  was delivered by unconventional gas plays
  - In 2018-2019,  $\leq 55\%$  of was delivered by gas plays, the rest came from oil plays
- Environmental regulations (flaring, CO<sub>2</sub>) in general lead to higher supply;

# Implications for Europe

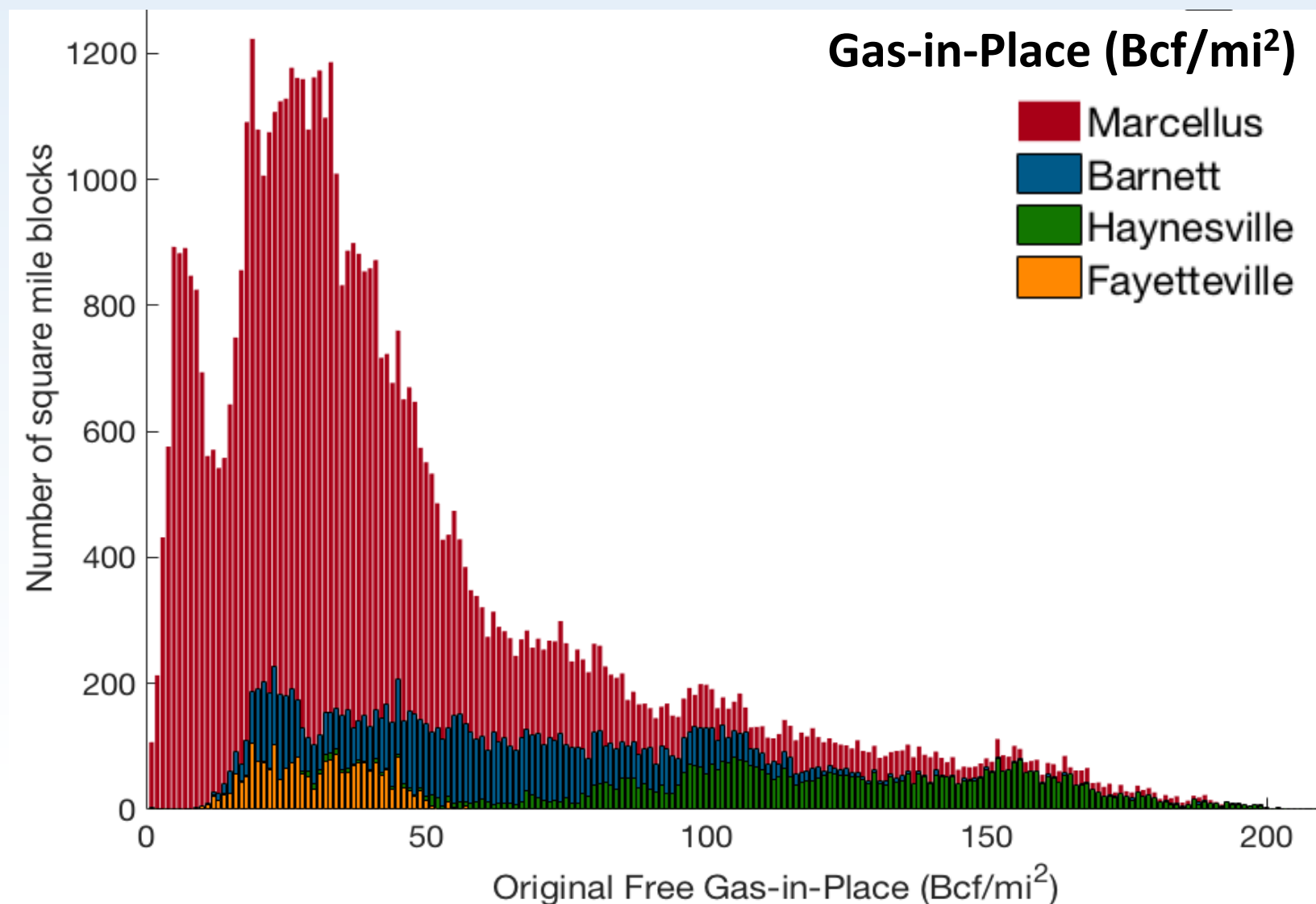
- Even consumers without direct contracts with the U.S. benefit from increased competition in the global natural gas markets, keeping prices low;
- Increasing liquidity and flexibility of the LNG trade attracts new European trade-partners and supports the growing trade volumes for U.S. natural gas & oil:
  - The U.S. LNG exports soared to ~3,000 MMcf/d from ~80 MMcf/d in just 3 years
- Trade war between the world biggest producer and consumer/importer raises a question on whom the residual supply and demand will be “splashed”, benefits for Europe?!;
- The future implications for Europe would also depend on the EU regulations! How much it would allow itself benefit.
- Unconventionals is a global phenomenon and non-U.S. assets may enter the game (+offshore) attracting capital and demand away from the U.S. .



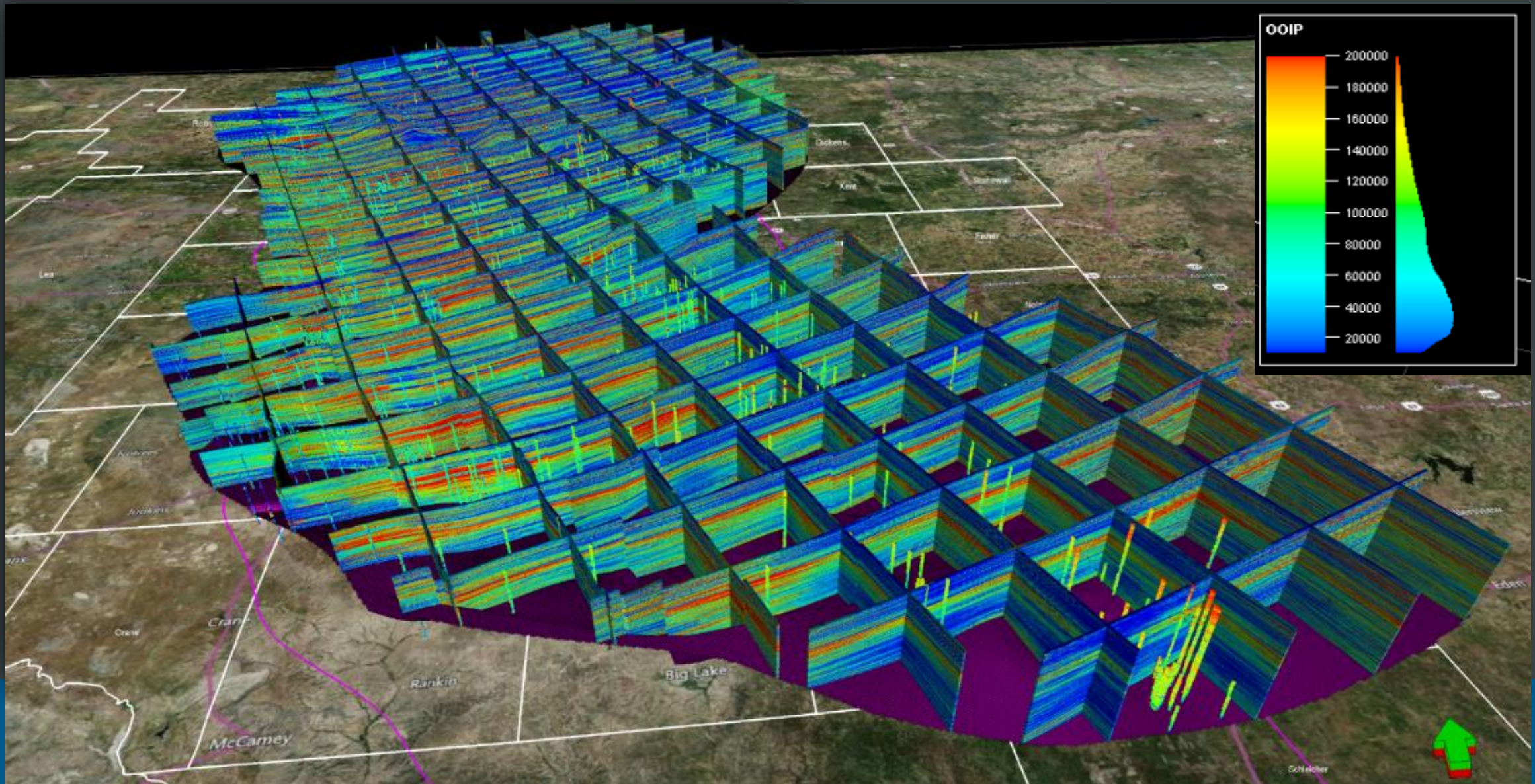
# Some Insights about *Unconventional Resources in the U.S.*

# Resource is not evenly distributed

## *A large portion of it may never be recovered*

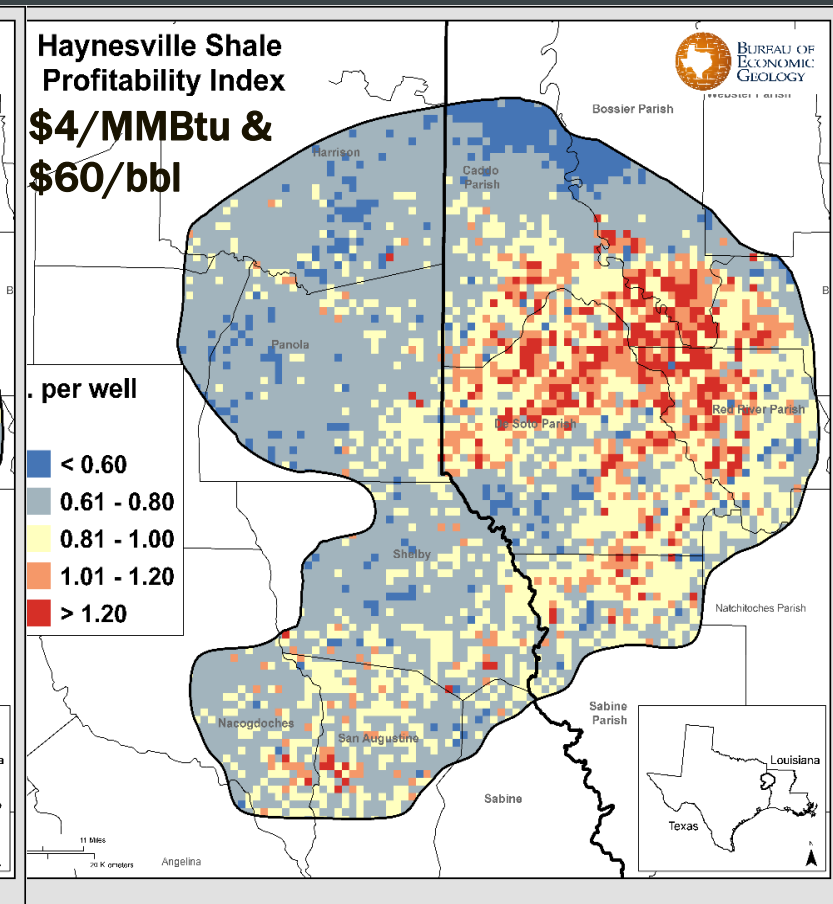
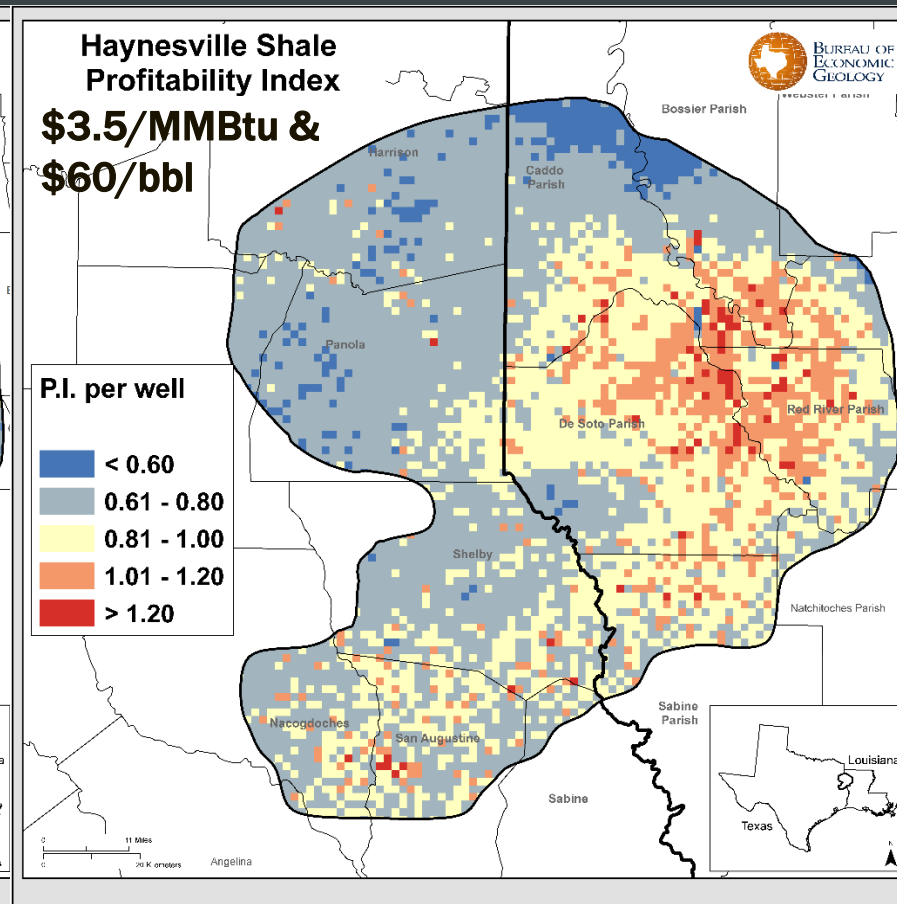
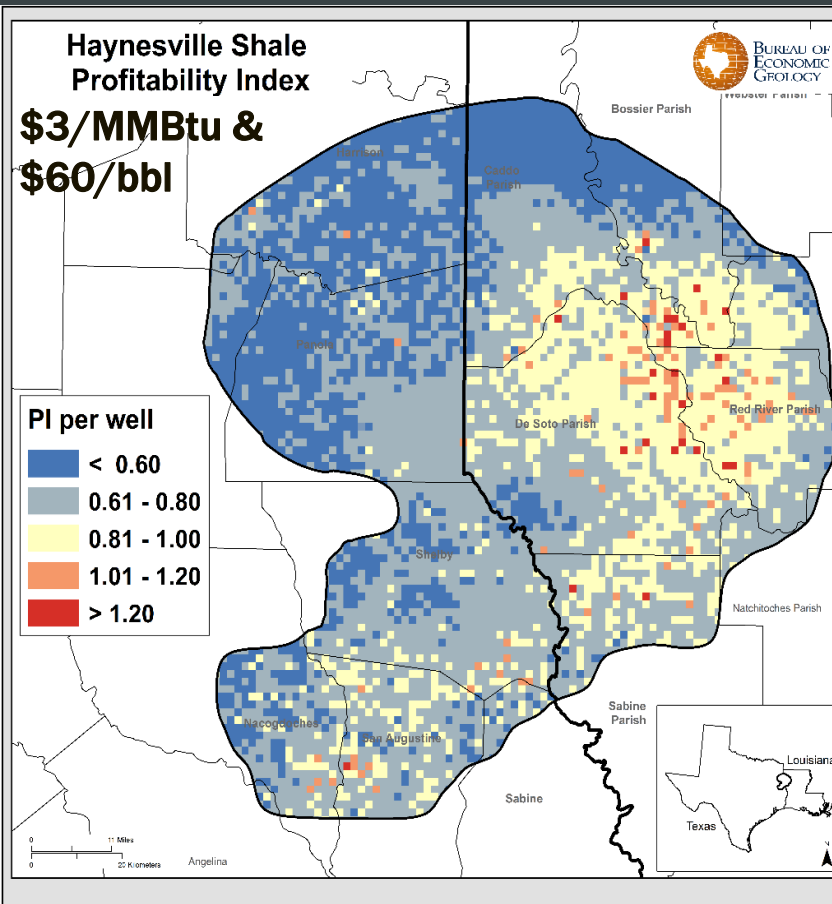


# New Completion Strategies

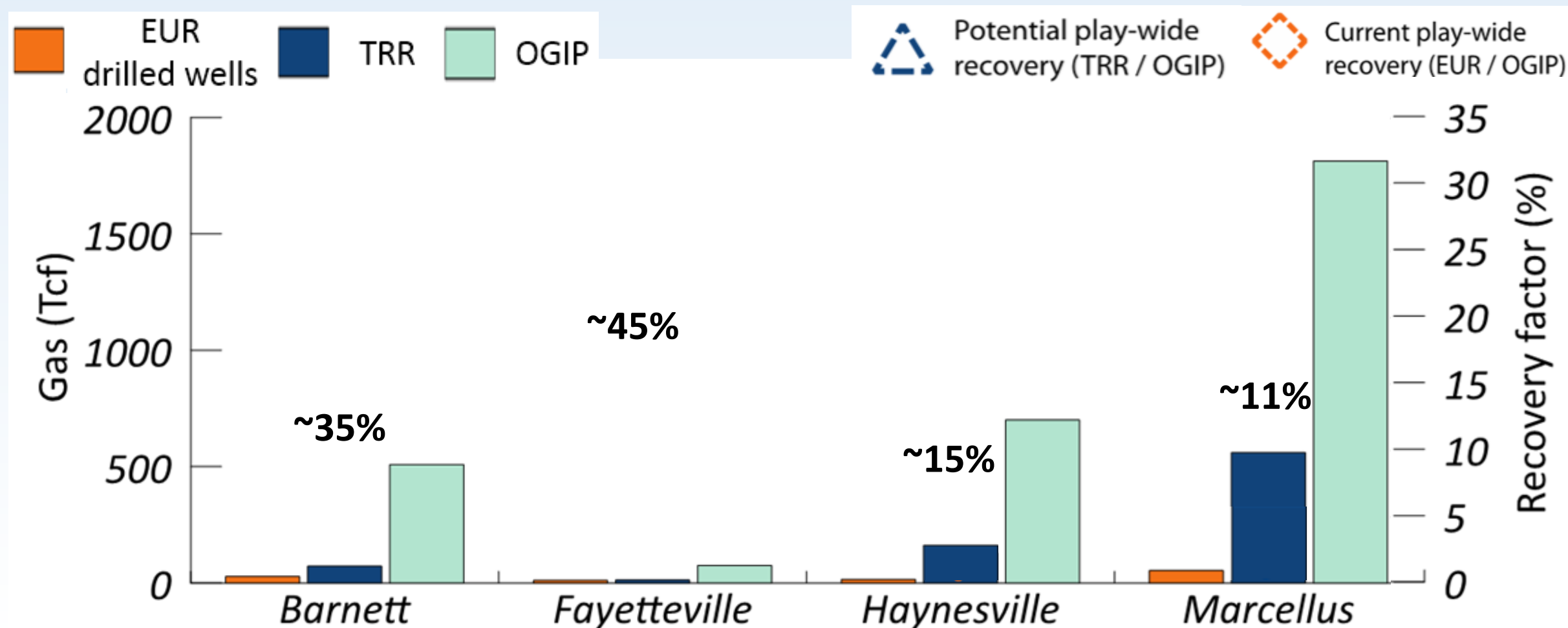




# Change in Productivity and Profitability: Haynesville

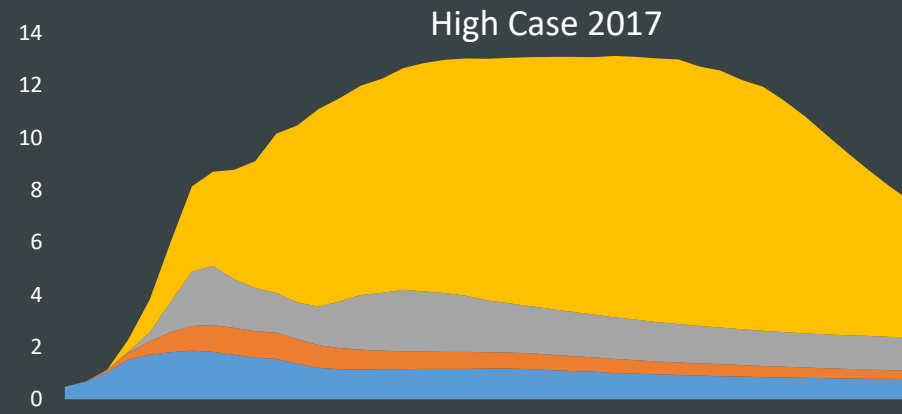
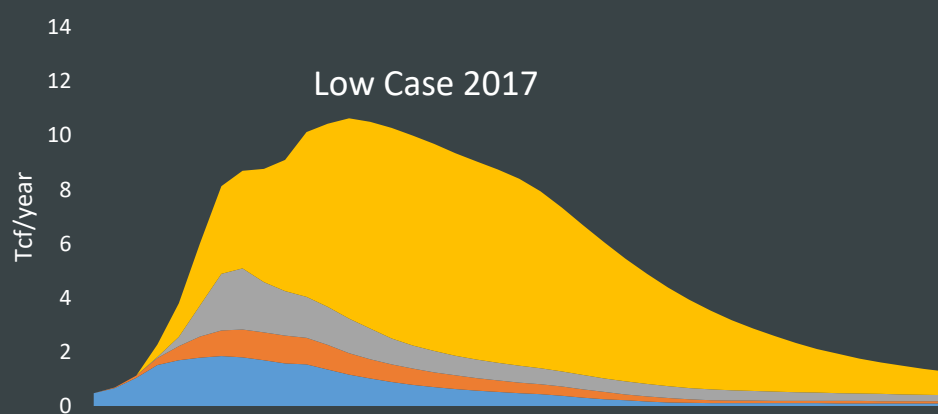
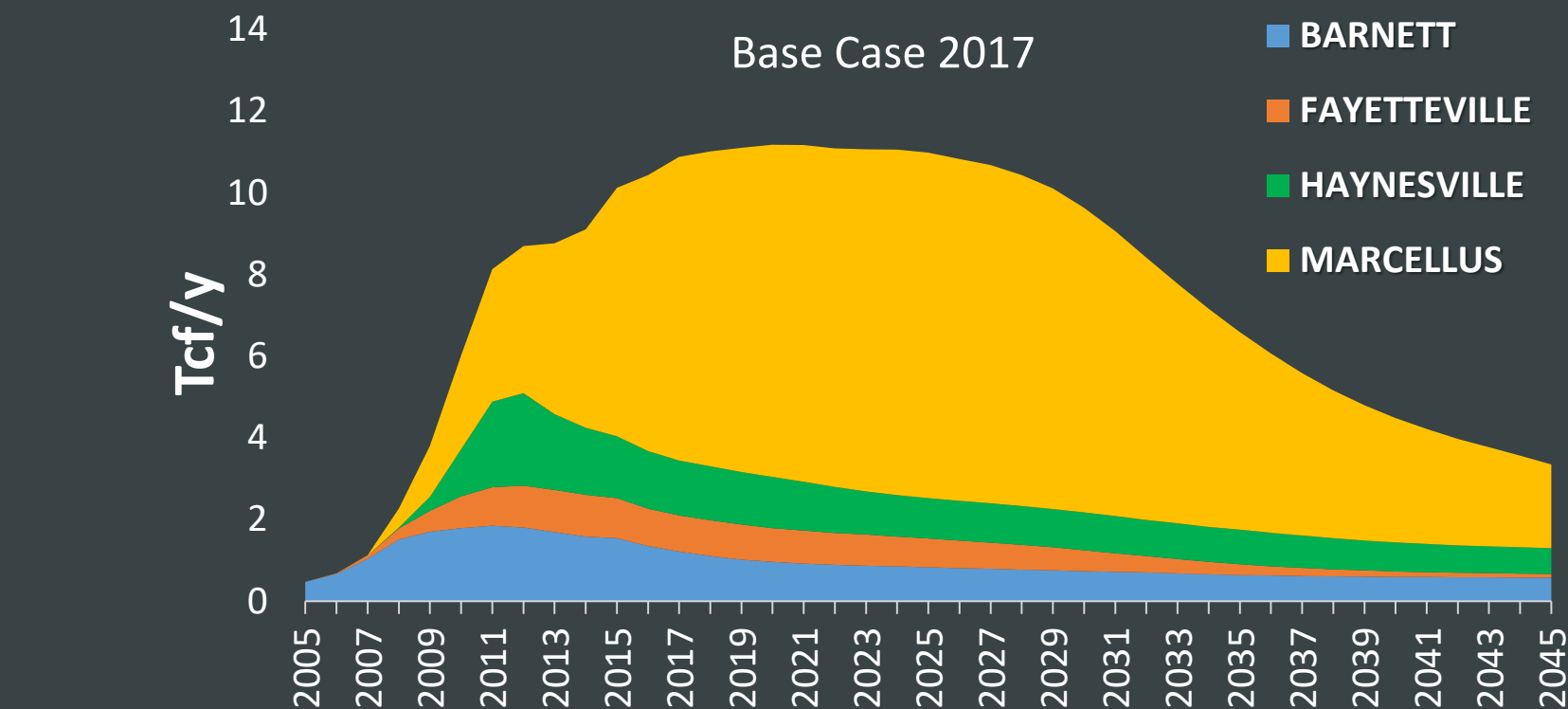


# Resource-In-Place, Technically Recoverable, and EUR

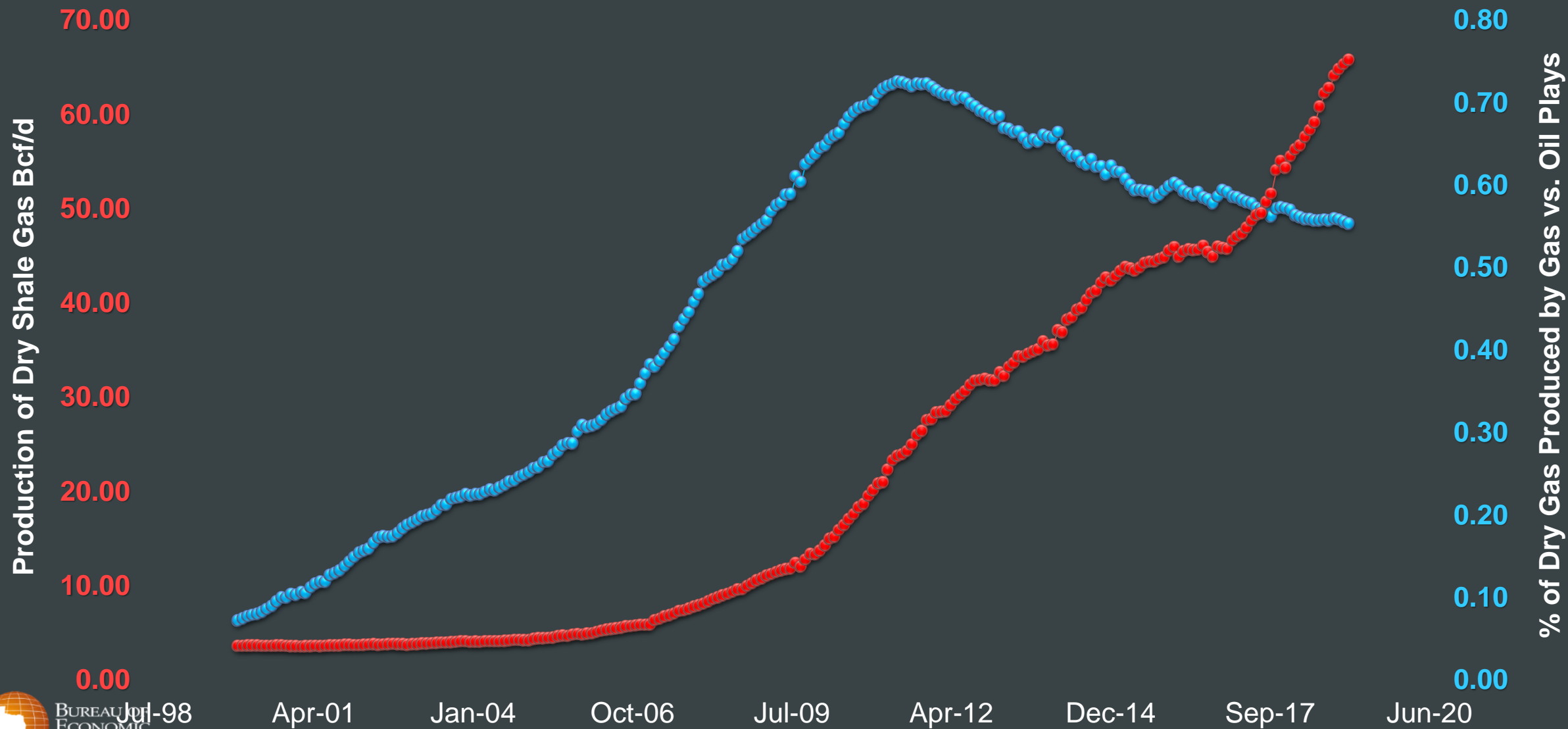




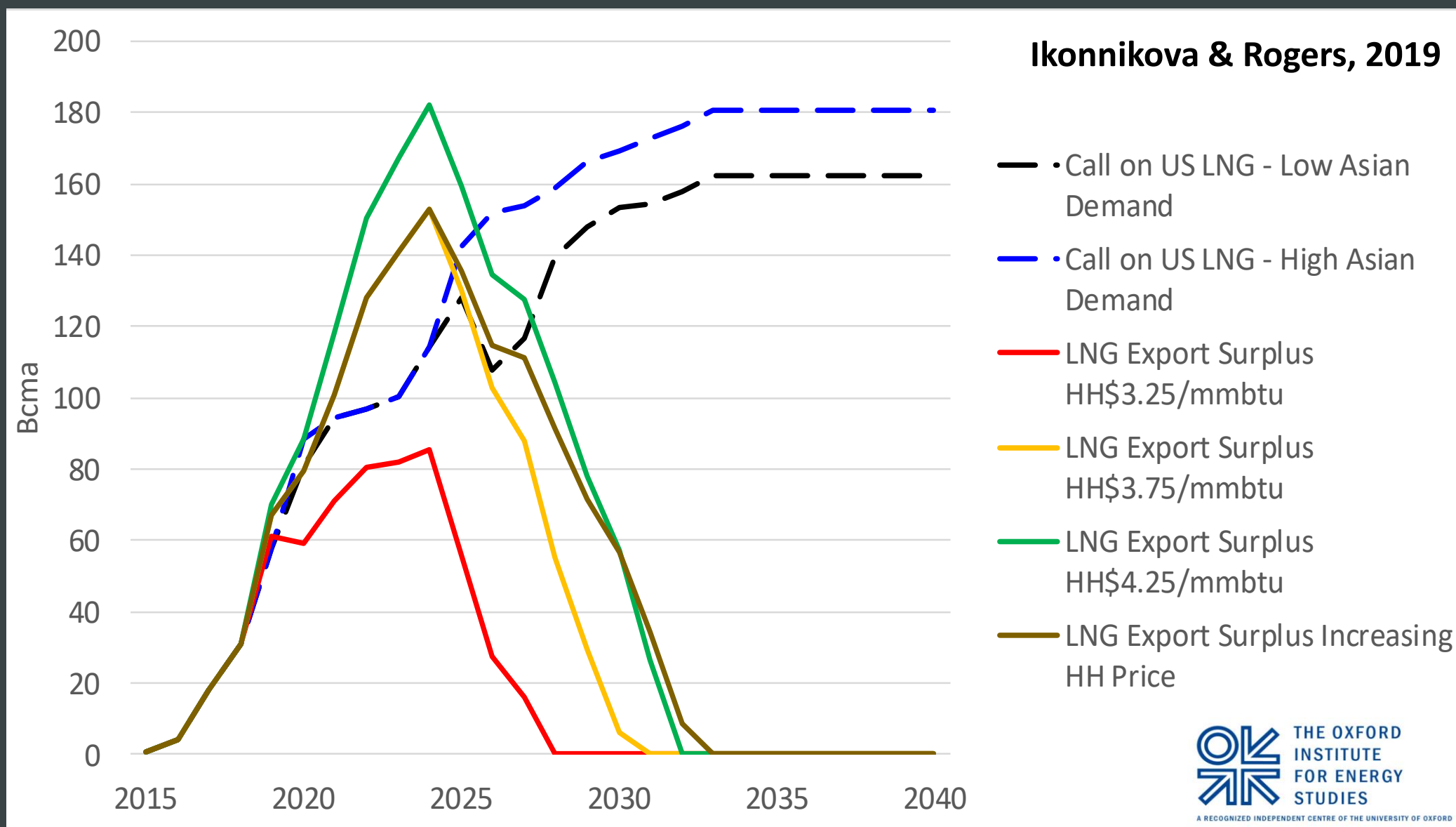
# Expectations For Supply from Shale Gas Plays



# Change in Relationship between Natural Gas and Oil



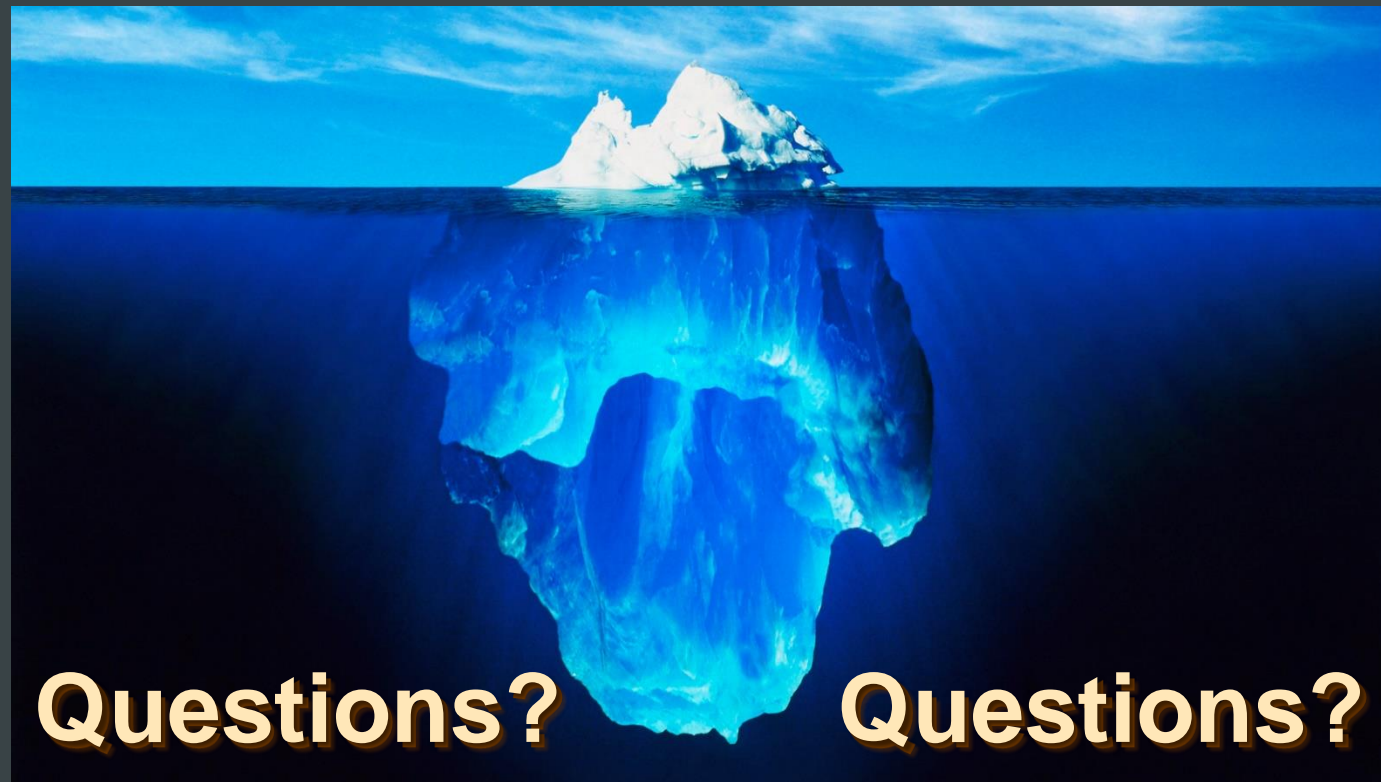
# Surplus or Deficit of LNG: Balancing the U.S. Supply



# Summary

- ❖ Oil price recovery + low NG price has led to extensified and intensified development:
  - Bottlenecks in infrastructure, Increased price fluctuations, Faster exhaustion of locations with better return and higher productivity.
- ❖ Producers push operational efficiencies to sustain production under low prices, but the decrease in well inventories would call for a price & technology push past 2025;
- ❖ Difficulties to attract capital to low return locations, would call for new discoveries if the supply to be kept at plateau allowing to cover LNG demands;
- ❖ Trade Wars reveal the importance of the resource in the U.S. domestic and foreign affairs:
  - Jobs, Energy Security/Dominance, and Trade Balance
  - Emission reductions
  - Role on the global market with implications to liquidity, pricing and investments

# Thank you!



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