

An aerial photograph of the LNG tanker GALEA docked at a port. The ship is dark grey with two large white spherical storage tanks on its deck. The name 'GALEA' is visible on the hull. The port area includes a concrete pier, a grassy area, and a body of water. In the background, there are hills and a city skyline under a clear sky.

**THE NORTH AMERICAN
PETROLEUM RENAISSANCE**
(Reshaping World LNG Markets)

**5th Frankfurt Gas Forum
December 13, 2017**

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Energy Policy Research Foundation**

About EPRINC



- Founded 1944
- Not-for-profit organization
- Studies intersection of petroleum economics and public policy
- Provides independent and technical analyses for distribution to the public
- Supports USG projects, e.g. Quadrennial Energy Review, DoD strategic outlook
- EPRINC Embassy Series
- IEEJ-EPRINC Project on “Future of ASIAN LNG
- www.eprinc.org



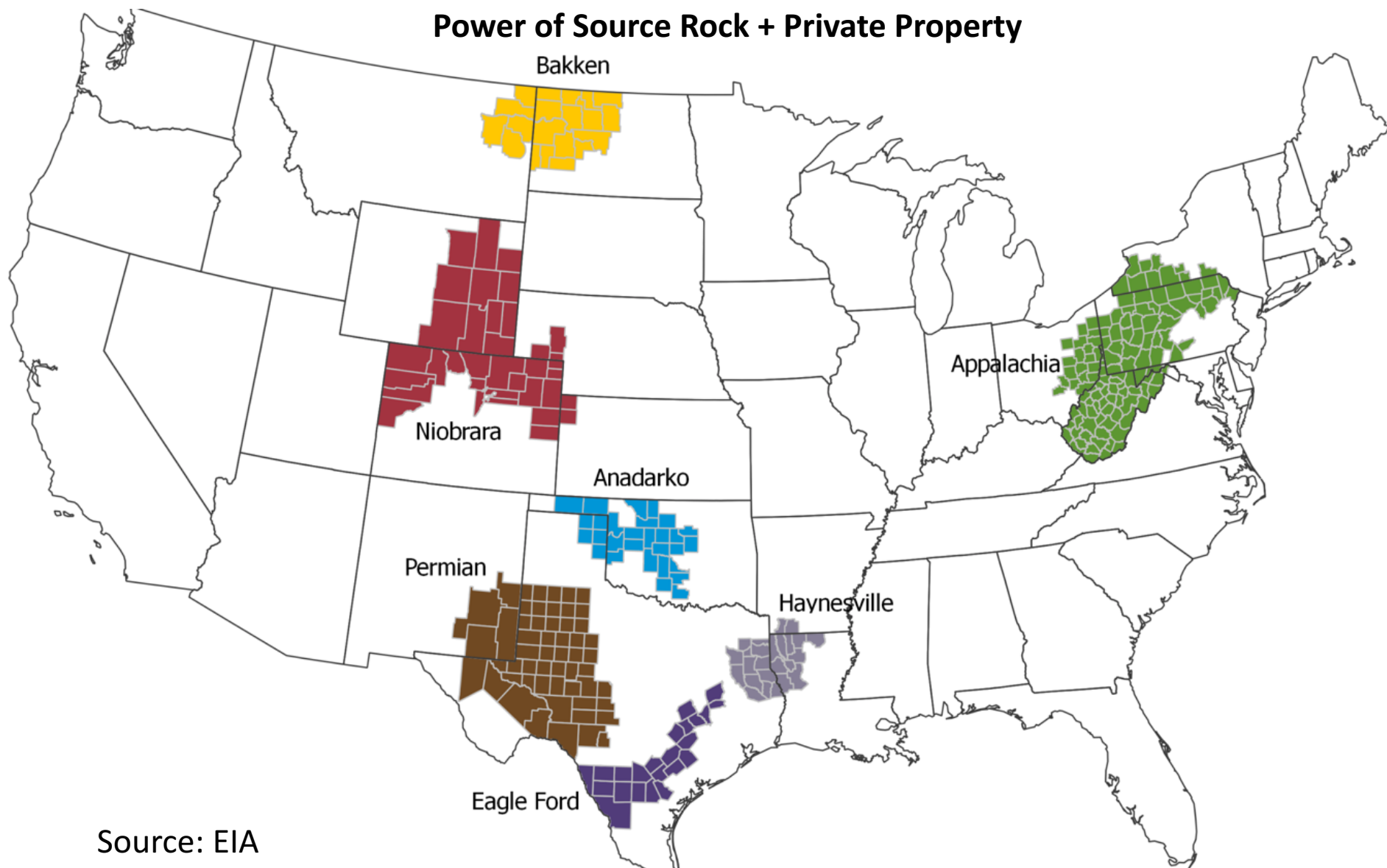
**ENERGY POLICY RESEARCH
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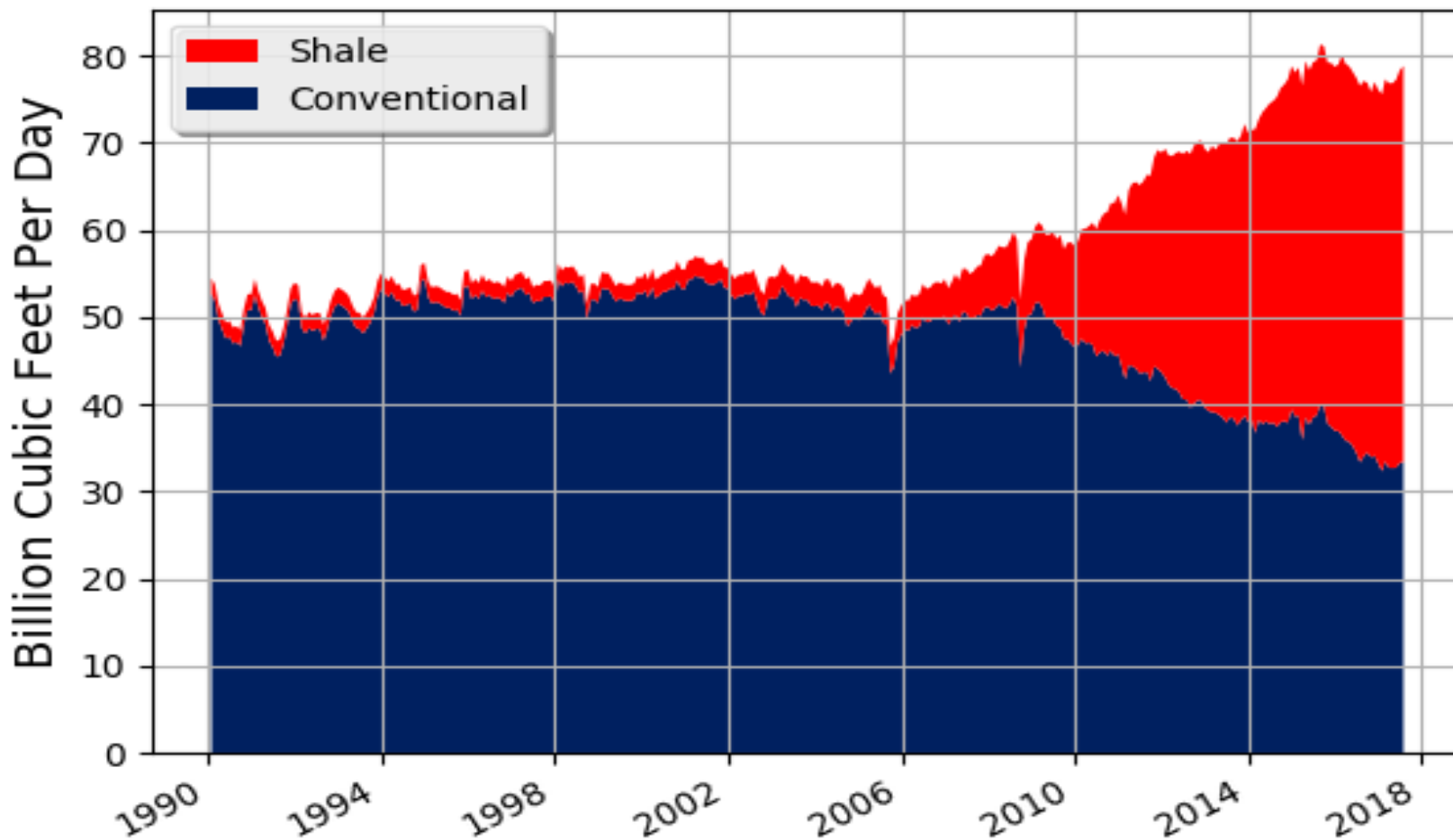
Main U.S. Shale Basins and Plays

Power of Source Rock + Private Property

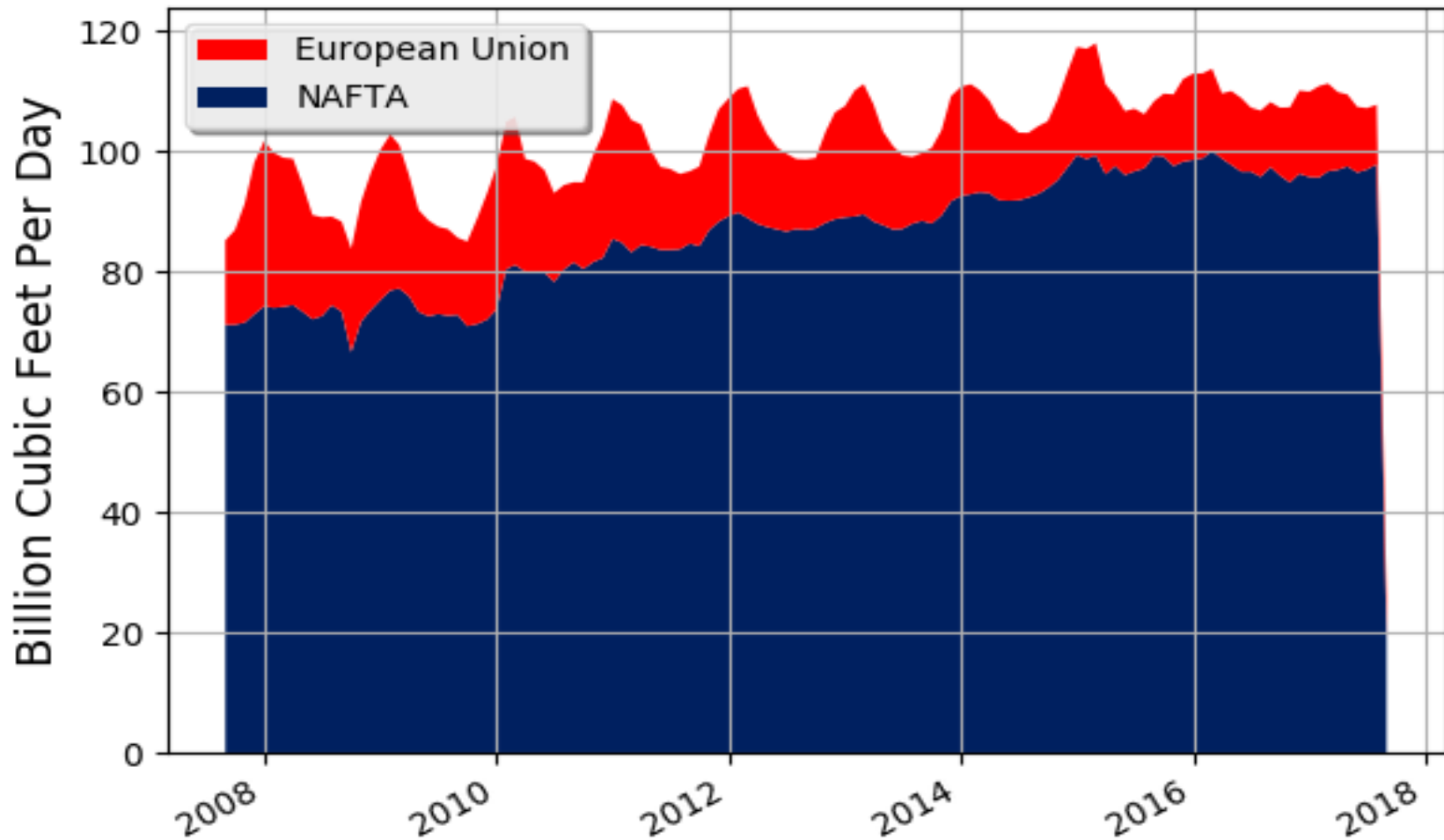


Source: EIA

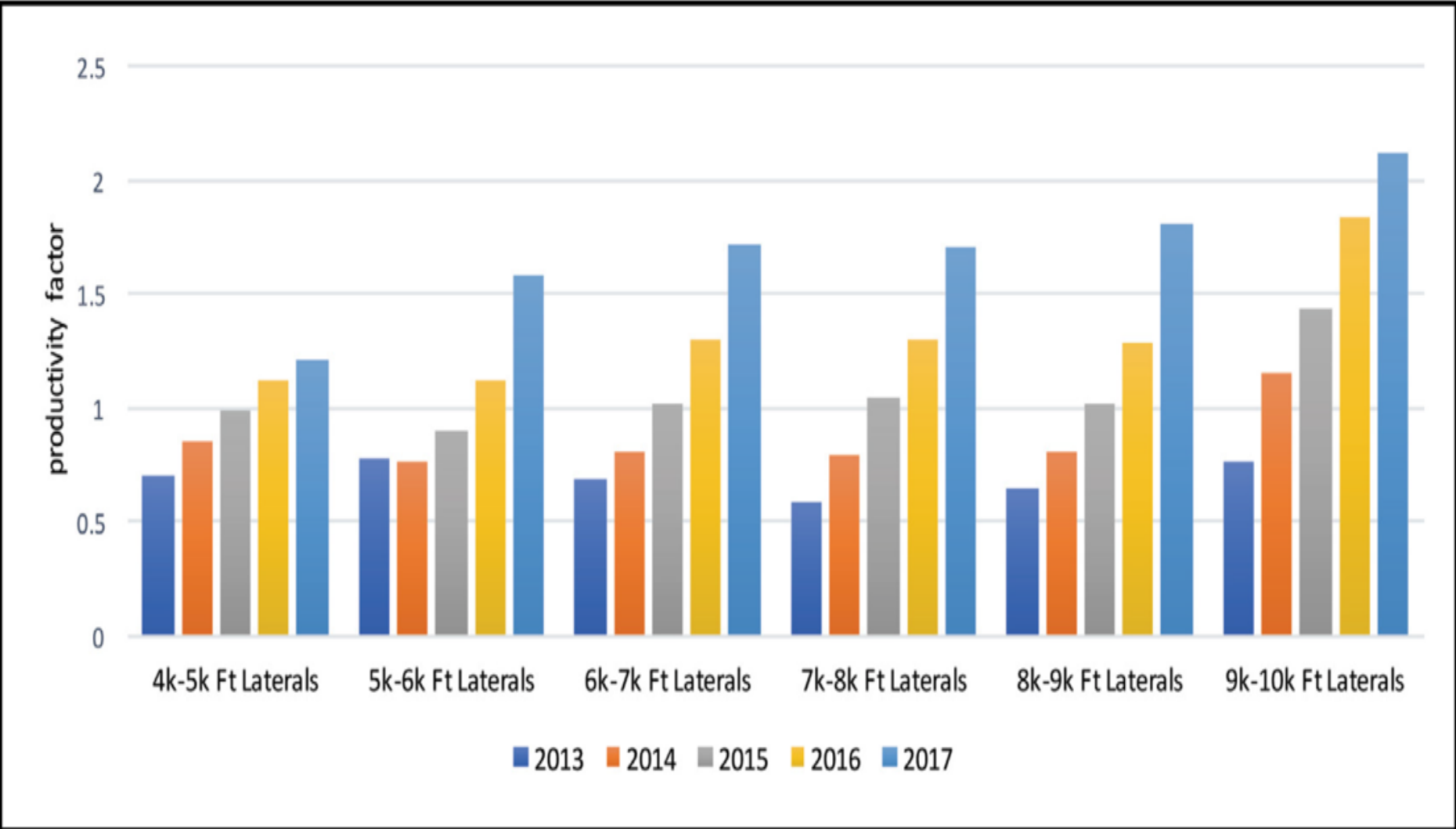
Monthly U.S. Natural Gas Production - Conventional Vs Shale: 08/31/1987 through 08/31/2017



Natural Gas Production: NAFTA and European Union: 08/24/2007 to 08/31/2017



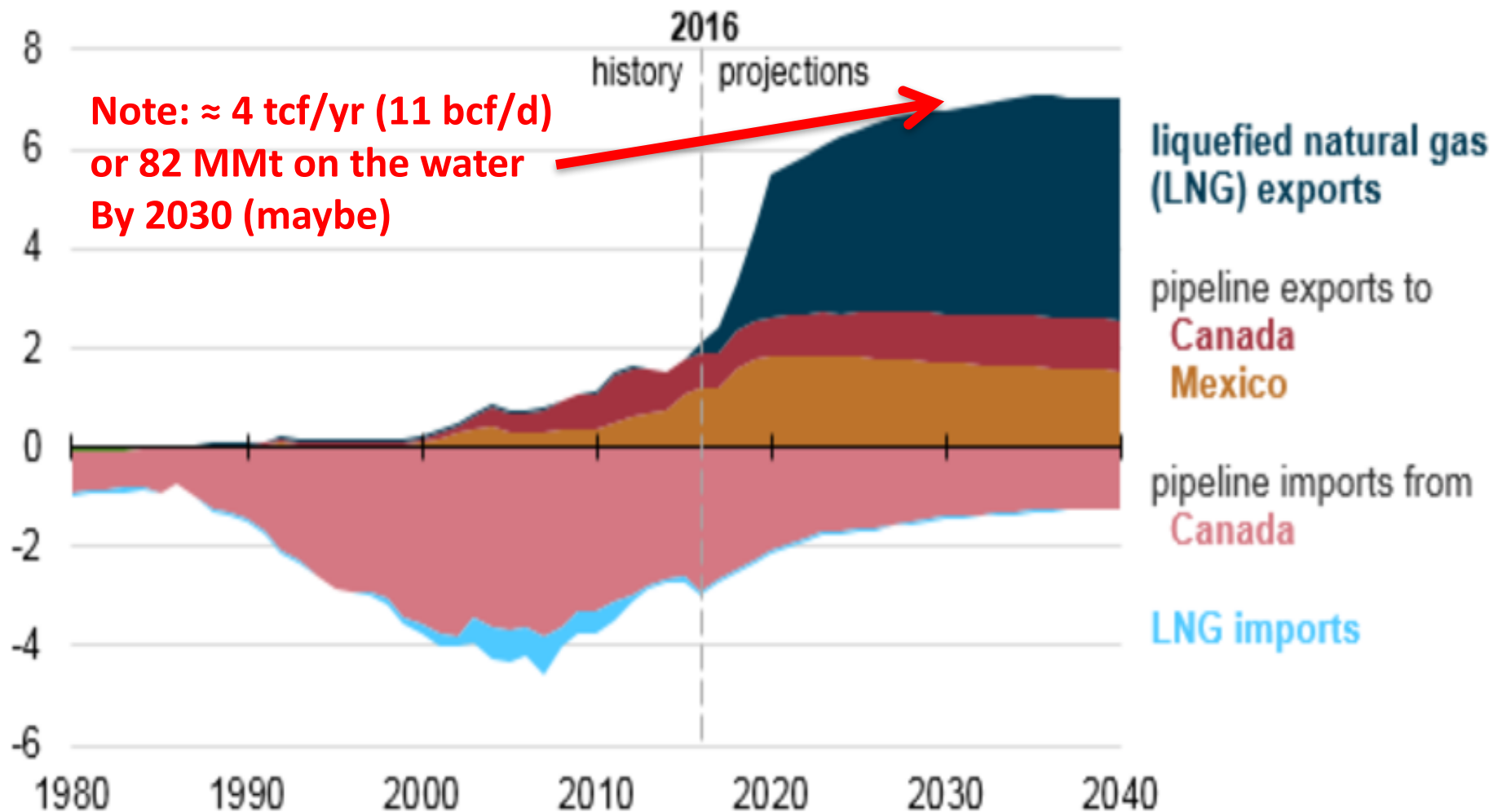
Permian Basin Horizontal Well Productivity by Lateral Length Segment



Source: **Completion Design Changes on Well Productivity**, Curtis & Montalbano, Forthcoming EPRINC paper, (November 2017). Note: Well productivity indexed to a base curve, which equals 1.

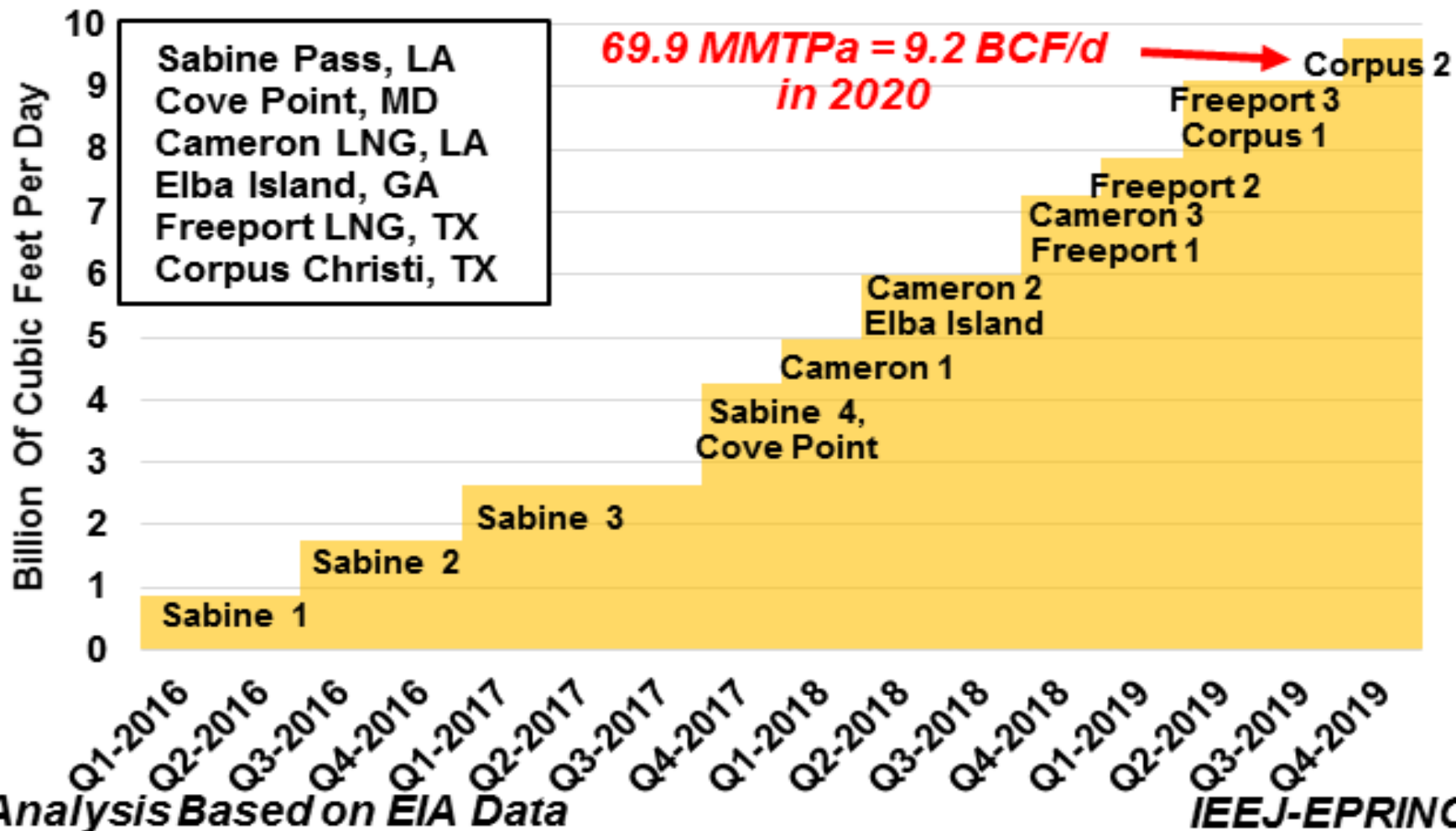
US NATURAL GAS EXPORT COULD GROW QUICKLY

trillions cubic feet/year

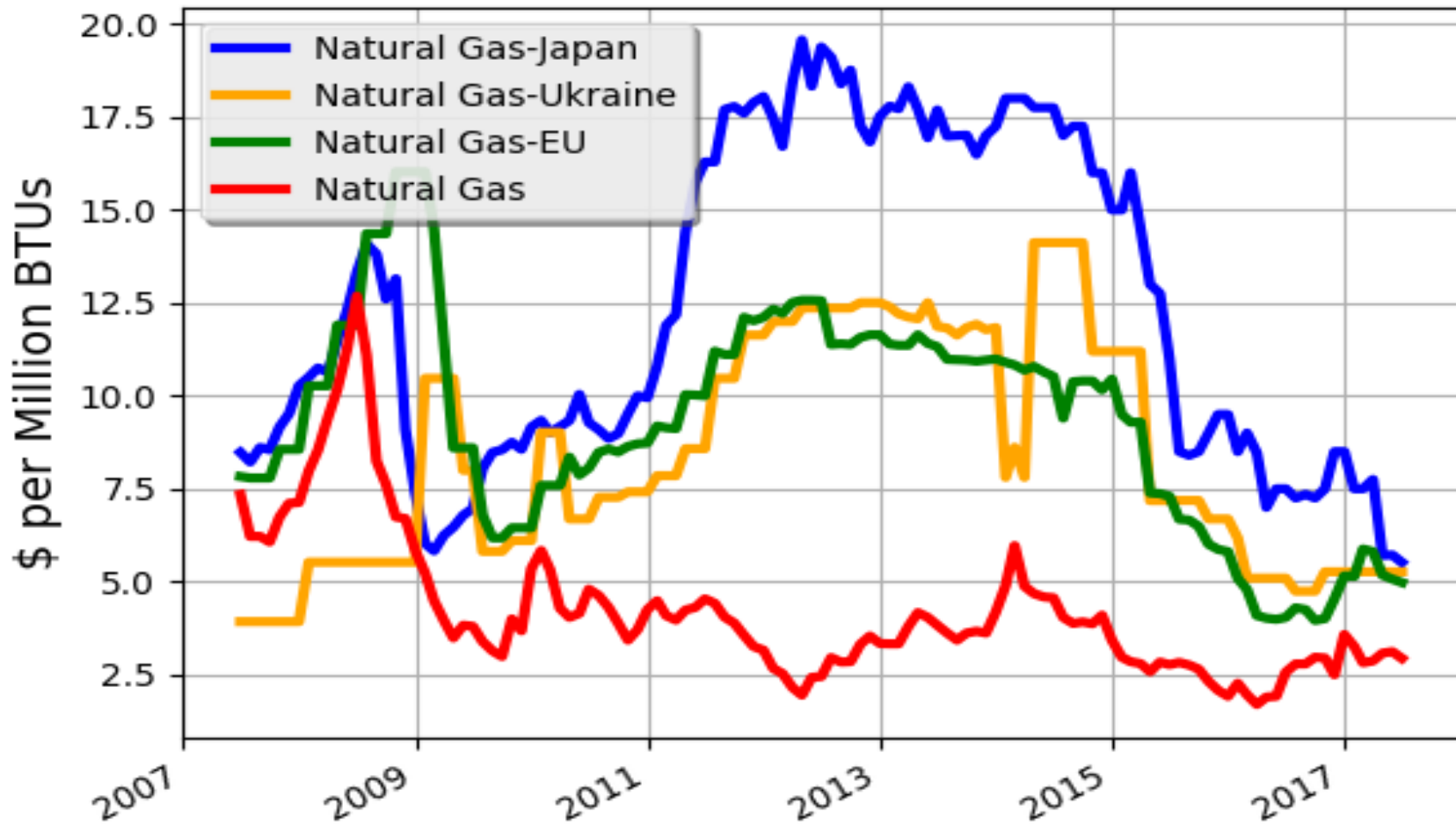


Source: EIA, Reference Case

U.S. LNG Exports Are Growing: Projects Approved and Commissioned Or Under Construction



Natural Gas-Japan, Natural Gas-Ukraine, Natural Gas-EU, Natural Gas: 06/30/2007 to 06/30/2017



US COMMITMENT TO GROWING THE WORLD LNG MARKET IS JUST BEGINNING

- ❑ The Institute of Energy Economics Japan (IEEJ) and the Energy Policy Research Foundation, Inc. (EPRINC) undertook an assessment of future LNG demand growth in Asia and strategies to improve the competitiveness of U.S. LNG exports in the region.
- ❑ The two organizations have reached out to nearly 100 experts, government officials and market participants through a series of workshops in Washington D.C., Tokyo, and Bangkok since July 2017.
- ❑ We also engaged our own research teams and the project received support from Economic Research Institute for ASEAN and East Asia ,as well as the U.S. and Japanese governments.



Improving the Competitive Position of US LNG Exports Cost Reduction Strategies

Standardized modular design, FSRUs, materials advances all offer opportunities to improve competitiveness of U.S. LNG exports to Asia, but cost reductions are limited by physical construction requirements and distance to market

Best opportunity for cost reduction is to lower and keep feedstock costs low

U.S. has ample gas reserves and highly liquid and transparent market, sustaining competitive U.S. LNG export platform requires.

- Streamline the regulatory process, including LNG export approval process.**
- Common sense environmental reviews to foster predictable and efficient build out of U.S. LNG export capacity.**
- Provide clarification of U.S. revocation risk on LNG exports to lower trade insurance costs.**

Improving the Competitive Position of US LNG Exports

Destination Clauses

U.S sales feature growing use of tolling charges instead of long-term point to point shipments, no destination clauses are required in U.S. exports

Global removal of destination clauses will help develop price discovery (reliably transmit price signals) for market participants

- **Asian markets lack a transparent pricing benchmark. Although Asia is the major natural gas-consuming region worldwide**
- **Growth in liquidity will lead to a gradual shift away from long-term fixed point sales to reliable regional LNG pricing, flexible contracts**

IEEJ – EPRINC recommendation is for removal of LNG destination restrictions in LNG contracts among all market participants to stimulate spot markets and price discovery. New and close dialogue is required to promote competition and LNG market growth.