

International Markets for Crude, Refined Products and LPG

IPAA's Annual Meeting – Napa, FL

Kristine Klavers

9 November 2017

London
Houston
Singapore
Moscow
Dubai
New York
Calgary
Santiago
Rio de Janeiro
Beijing
Shanghai
Tokyo
Sydney
Astana
Kiev
Cape Town
Riga
San Francisco
Washington

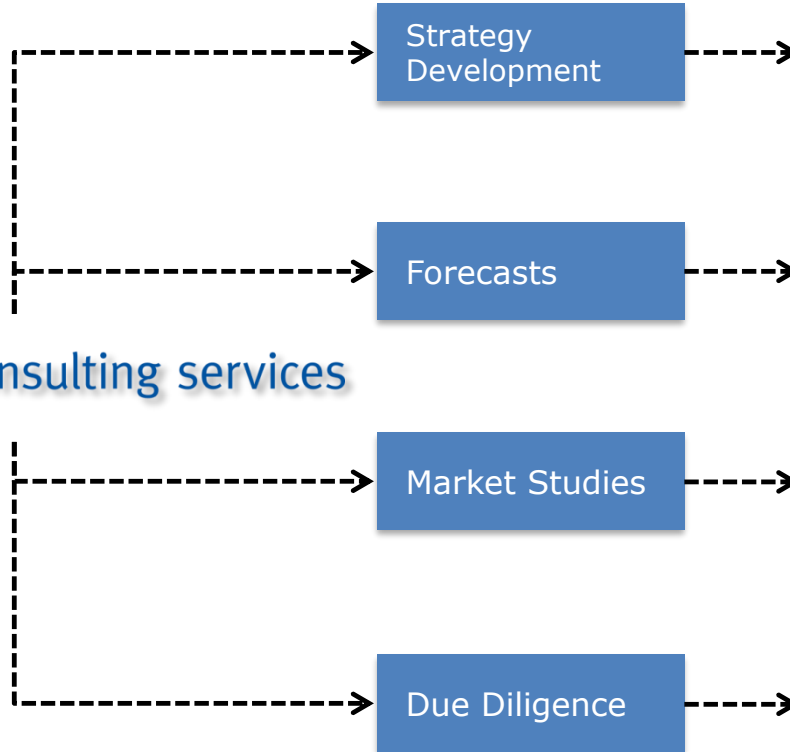
Argus Media group notices

- The Argus Media group (hereinafter referred to collectively as “Argus”) makes no representations or warranties about the accuracy or suitability of any information in this presentation and related materials (such as handouts, other presentation documents and recordings); all such content is provided to Argus presentation registrants on an “as is” basis without any warranty, condition or other representation as to its accuracy, completeness, or suitability for any particular purpose. Data and information contained in the presentation come from a variety of sources, some of which are third parties outside Argus’ control and some of which may not have been verified. All analysis and opinions, data, projections and forecasts provided may be based on assumptions that are not correct, being dependent upon fundamentals and other factors and events subject to change and uncertainty; future results or values could be materially different from any forecast or estimates described in the presentation.
- ARGUS DISCLAIMS ALL WARRANTIES REGARDING THE CONTENTS OF THESE MATERIALS, INCLUDING WITHOUT LIMITATION ALL WARRANTIES OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. Argus disclaims all liability for any claims, losses, damages, costs or expenses, including any indirect or consequential damages or lost profit, whether arising in negligence or otherwise, in connection with access to, use or application of these materials.
- The information contained in this presentation and related materials is provided for general information purposes only and not intended to constitute legal advice or the rendering of legal, consulting, or other professional services of any kind. Users of these materials should not in any manner rely upon or construe the information or resource materials in these materials as legal, or other professional advice and should not act or fail to act based upon the information in these materials.

Argus Consulting Services



consulting services



- Supply, demand and price forecasts
- Project feasibility studies & financial modeling
- Due diligence for banks and equity investors
- Process technology evaluations and comparisons
- Quantitative risk analysis
- Capital projects portfolio optimization
- Transportation vehicle forecasts
- Logistics analysis
- Process technology development & licensing support
- Operating cost reduction
- Regulations analysis
- Training

Global energy market in transition – International markets

Population and energy demand growth

Supply will diversify

Demand will diversify and shift

Environmental pressure will continue

Trade flows will change

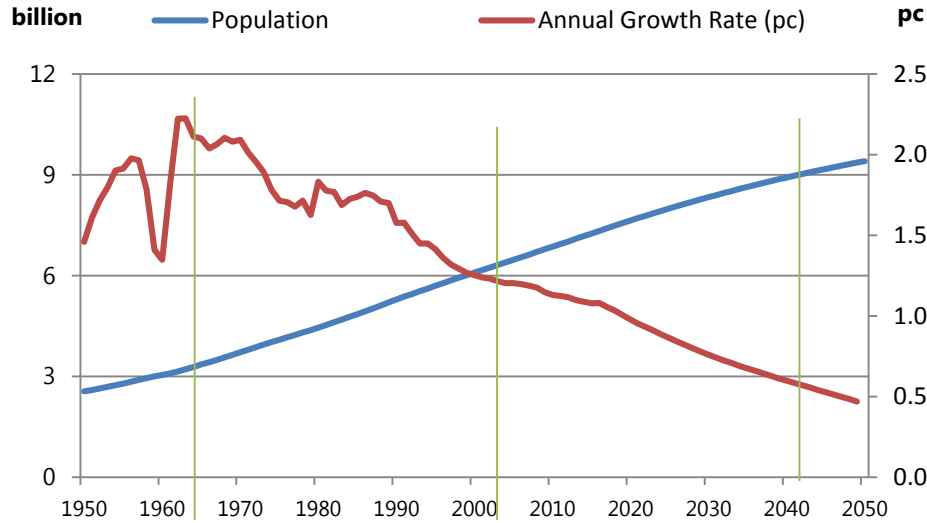
Shale oil and gas boom – New technologies

Geopolitical events



Population keeps growing

Population growth vs annual growth rate 1950-2050



Source: U.S. Census Bureau, International Data Base.

Rank by population	Country	Population	Energy consumption kgoe per 1000 capita
1	China	1,379,302,771	2.2
2	India	1,281,935,911	0.6
3	United States	326,625,791	7.0
4	Indonesia	260,580,739	0.9
5	Brazil	207,353,391	1.5
6	Pakistan	204,924,861	0.5
7	Nigeria	190,632,261	0.8
8	Bangladesh	157,826,578	0.2
9	Russia	142,257,519	4.9
10	Japan	126,451,398	3.5
11	Mexico	124,574,795	1.5
19	Germany	80,594,017	3.8
22	United Kingdom	64,769,452	2.8

Source: World Bank

Global GDP PPP outlook

	2010-2015	2015-2020
Russia and central Asia	3.7%	3.4%
Western Europe	2.5%	3.6%
Southeast Asia	5.8%	7.1%
North America	3.9%	4.0%
Middle East	4.5%	5.2%
China	9.7%	8.3%
India	8.5%	9.9%

Source: IMF, Argus Consulting

Review of market fundamentals for:

- Crude
- Refined products
- LPG

Crude market dynamics

Technology: Shale & Offshore

US is a growing oil exporter 2015

Oil peak demand?

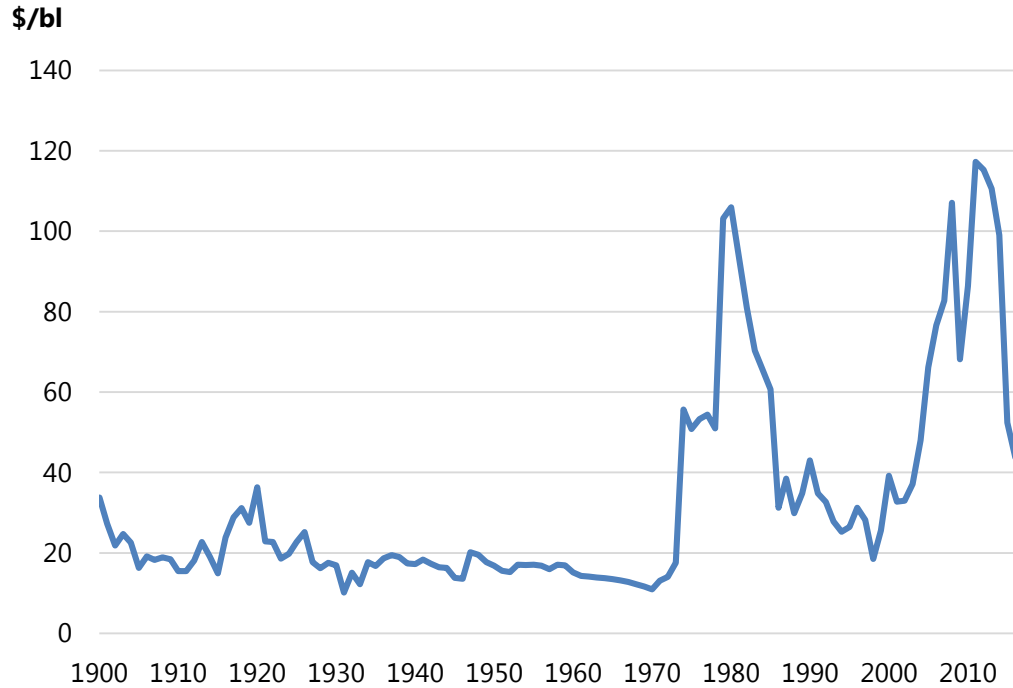
Geopolitical events

Wildcards

- Demand diversity
- Environmental pressure:
 - Cleaner fuels
 - Fracking regulations, activities

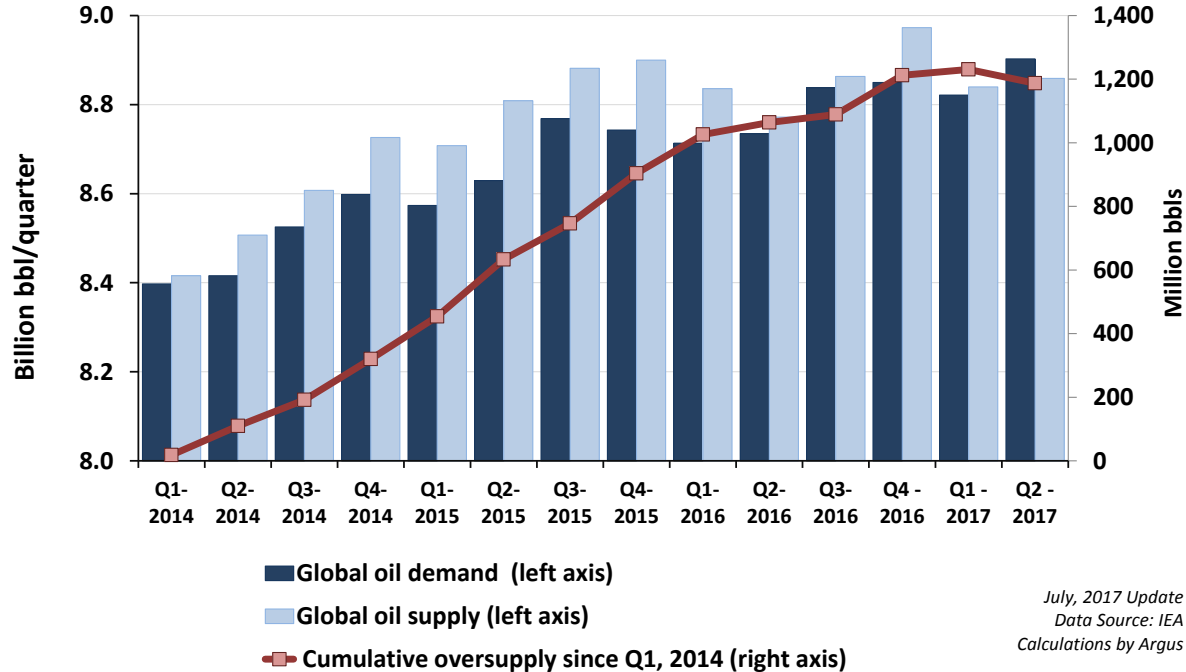


Annual historic crude price

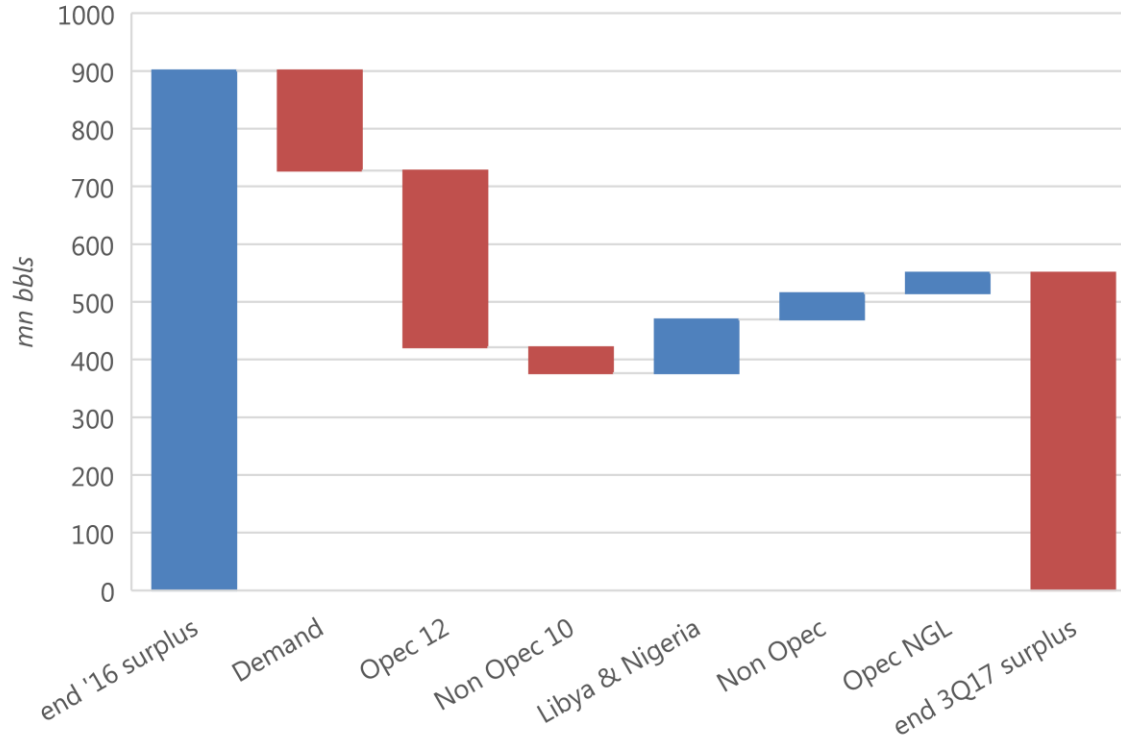


Global oil supply, demand and cumulative oversupply

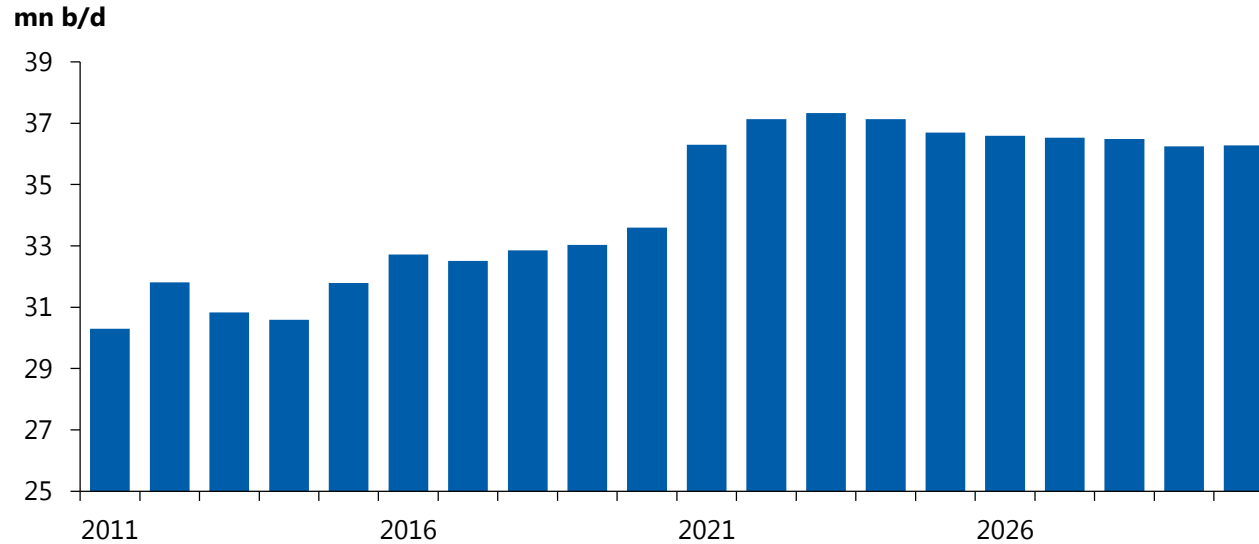
World Oil Demand, Supply and Cumulative Oversupply



Rebalancing process has started

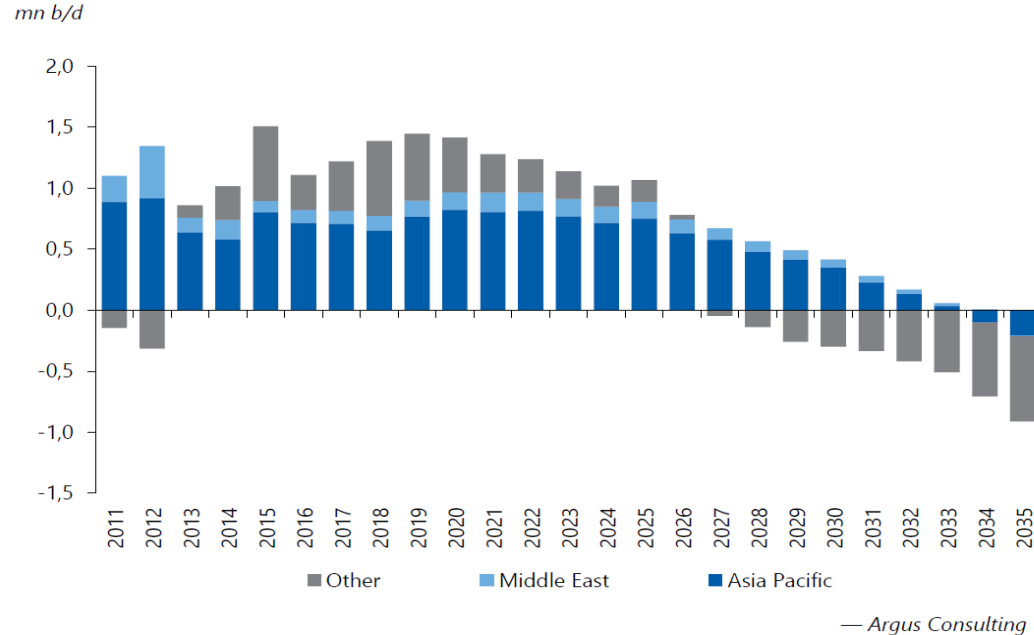


Opec will become key marginal supplier again

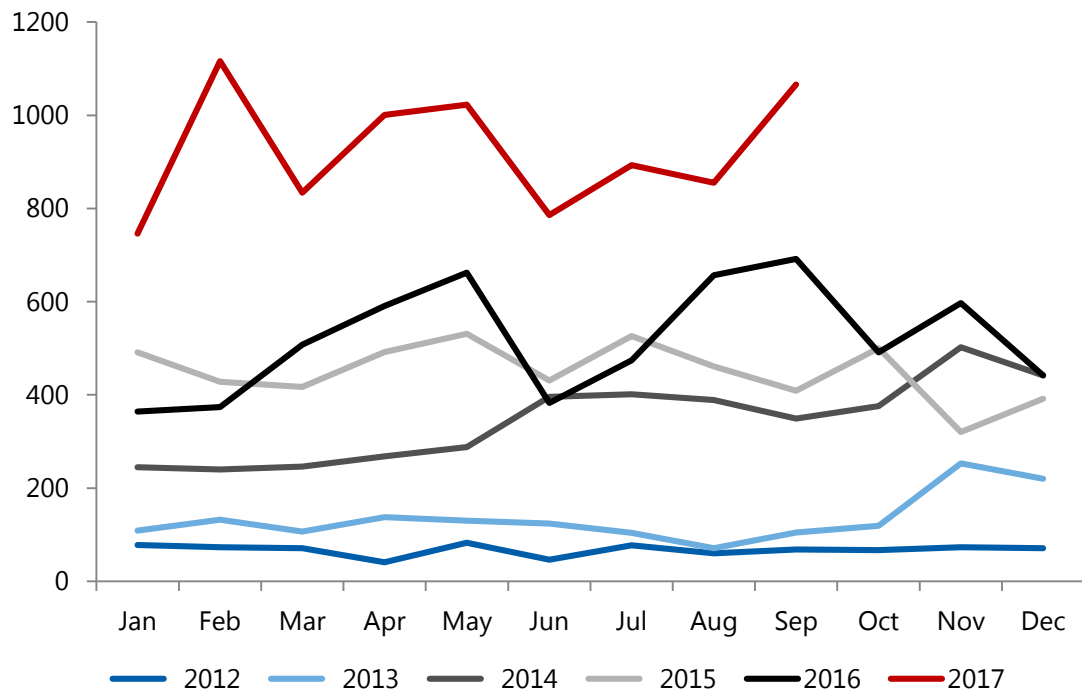


Continued growth, but a slowdown from 2030

Figure 1-3: Annual change in global oil demand



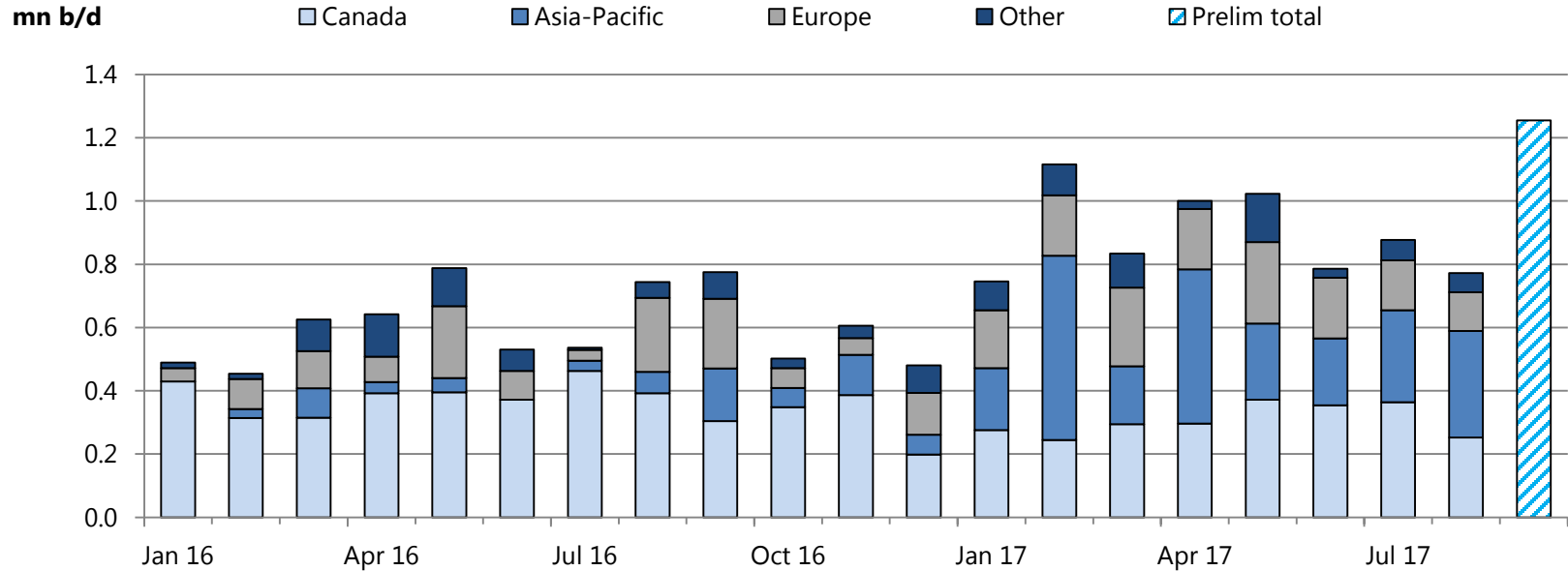
US crude exports – More than 1mn b/d and climbing



– EIA monthly and weekly data

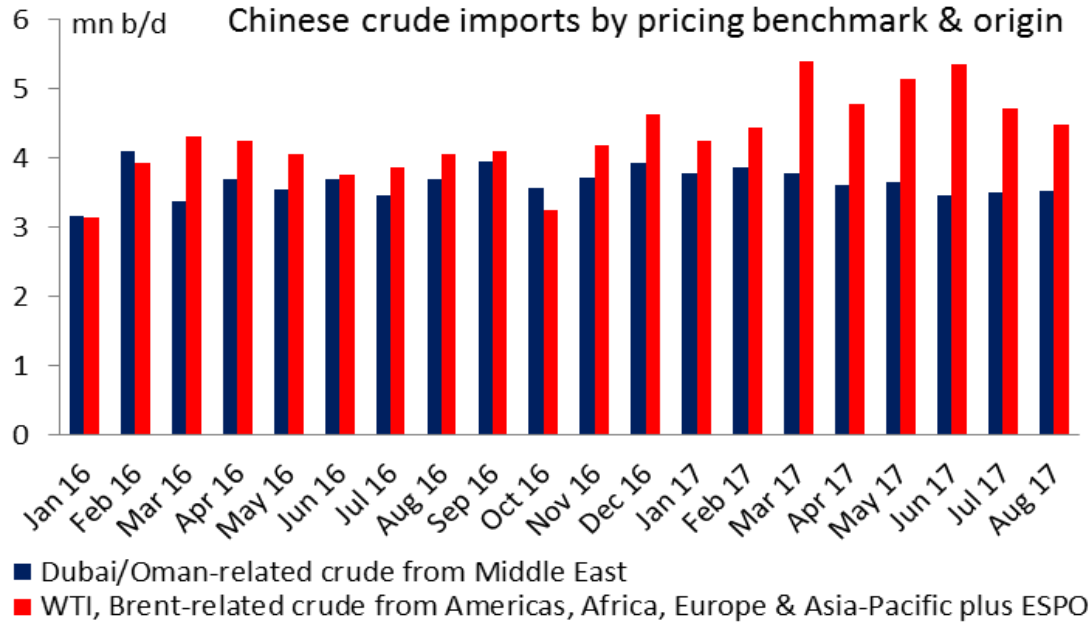
Asia is the growing destination for US exports

US crude exports



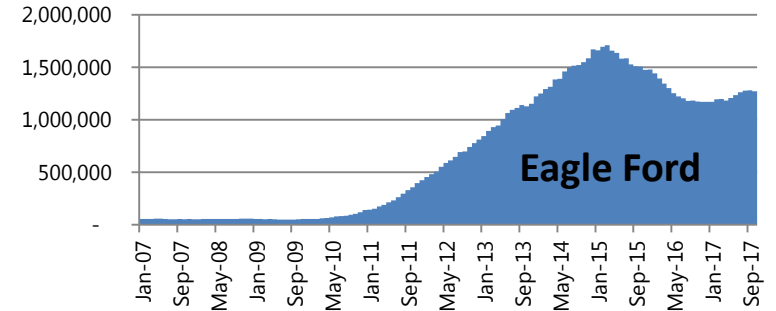
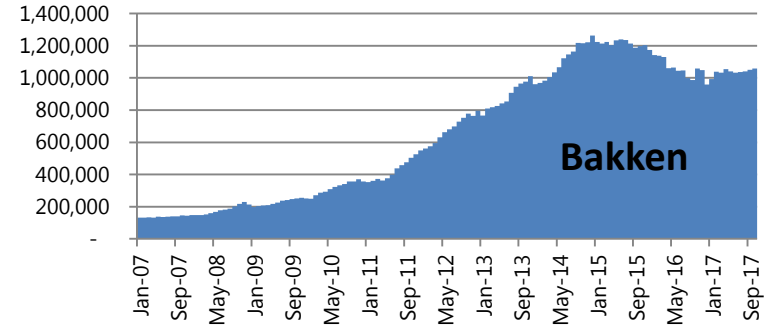
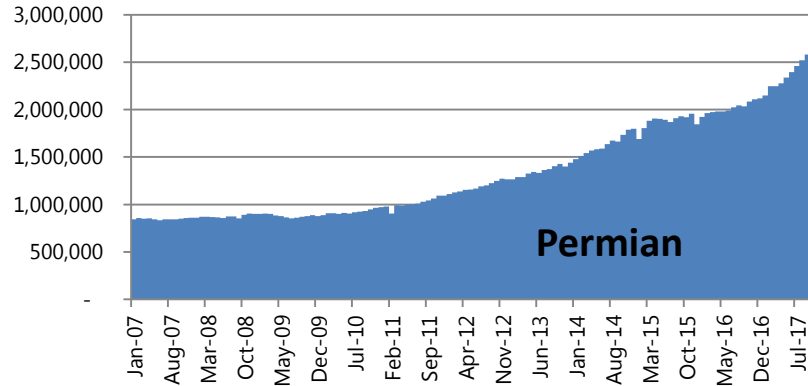
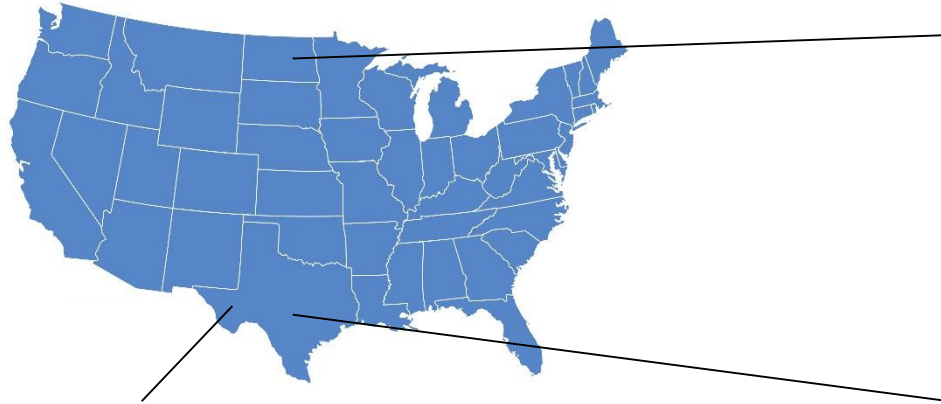
Source: EIA and US Customs data

US crude accelerates relative decline of ME into China



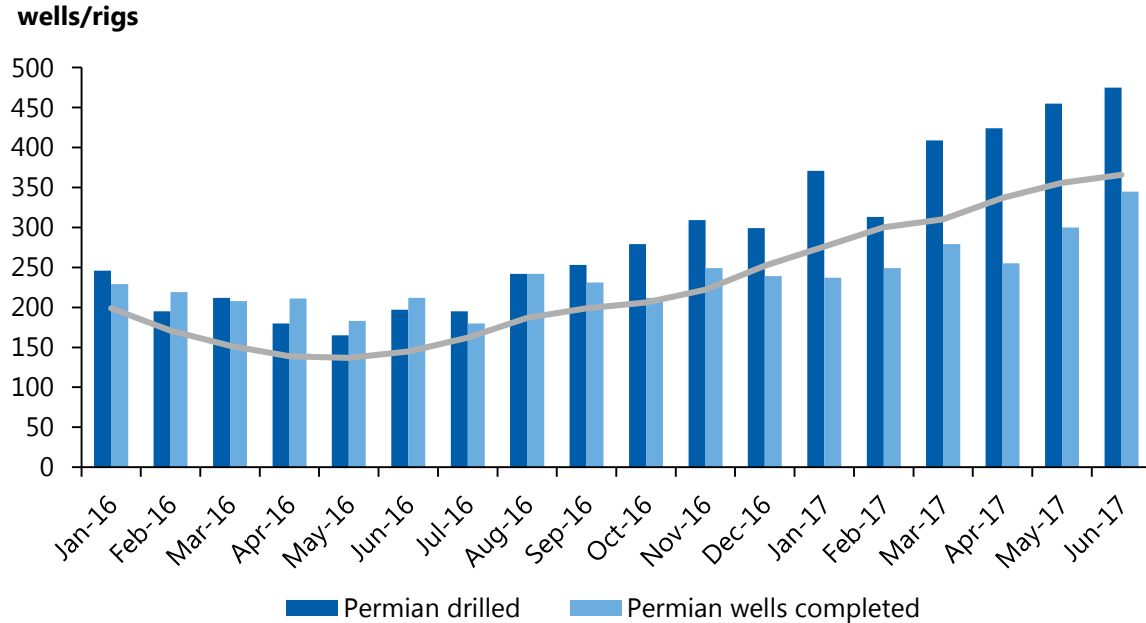
Source: Argus China Petroleum

Permian is leading recovery in shale oil output growth



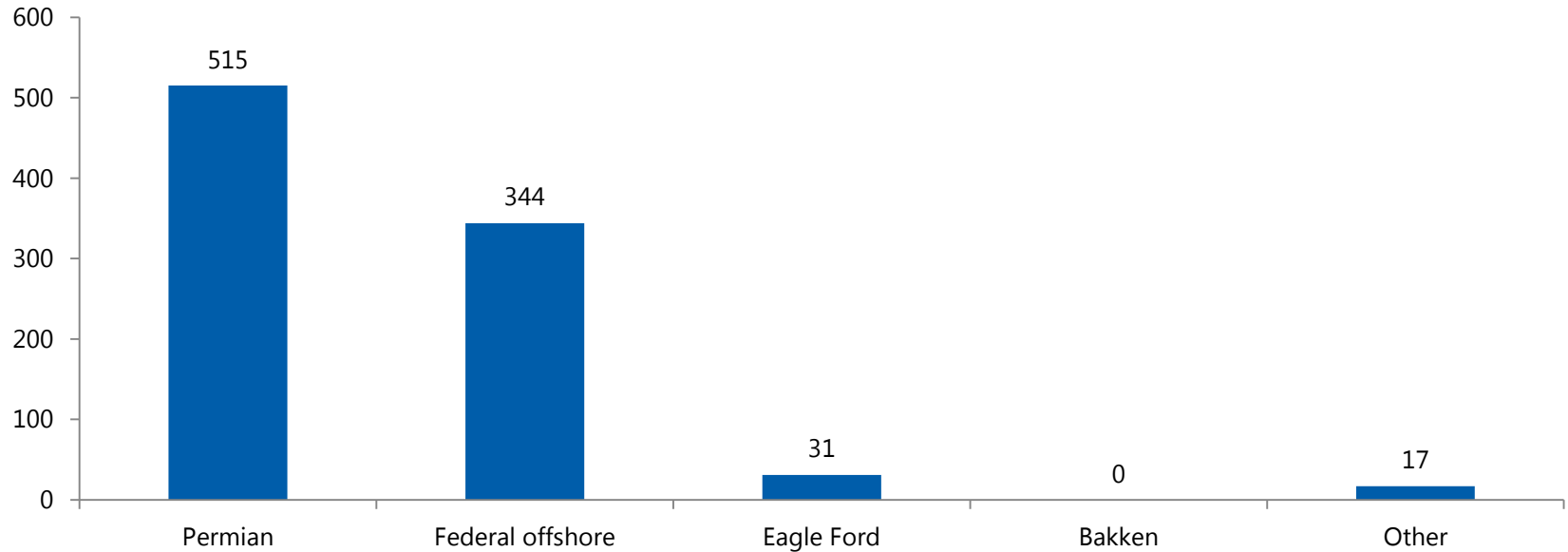
Source: EIA Drilling Productivity Report, Sept 2017

Prolific low cost Permian Basin driving US growth



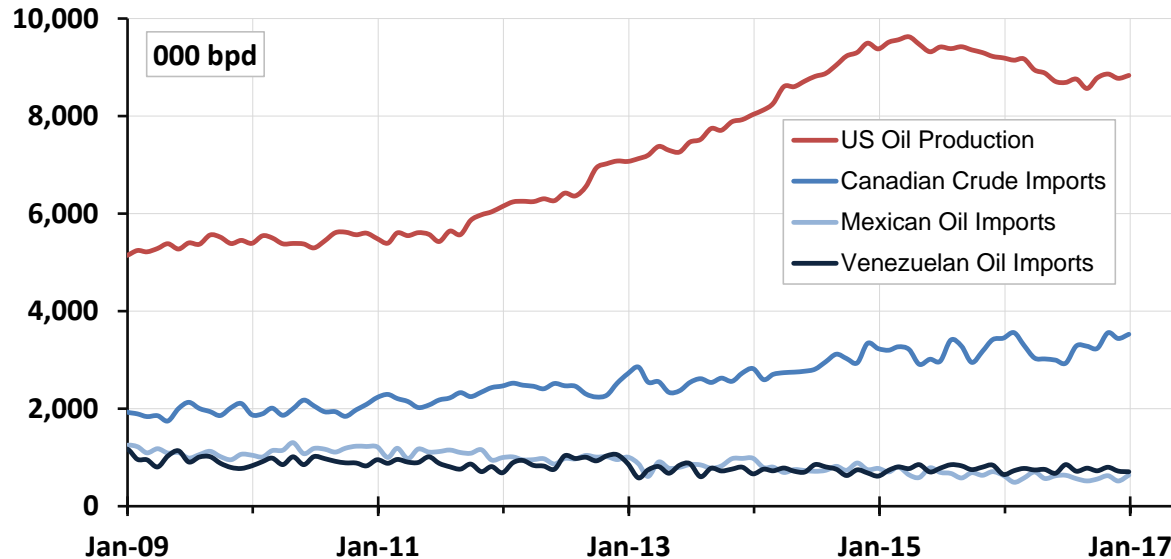
Don't forget about the US offshore growth

**Forecast US crude output growth
(Jun '17 - Dec '18, in '000 b/d)**

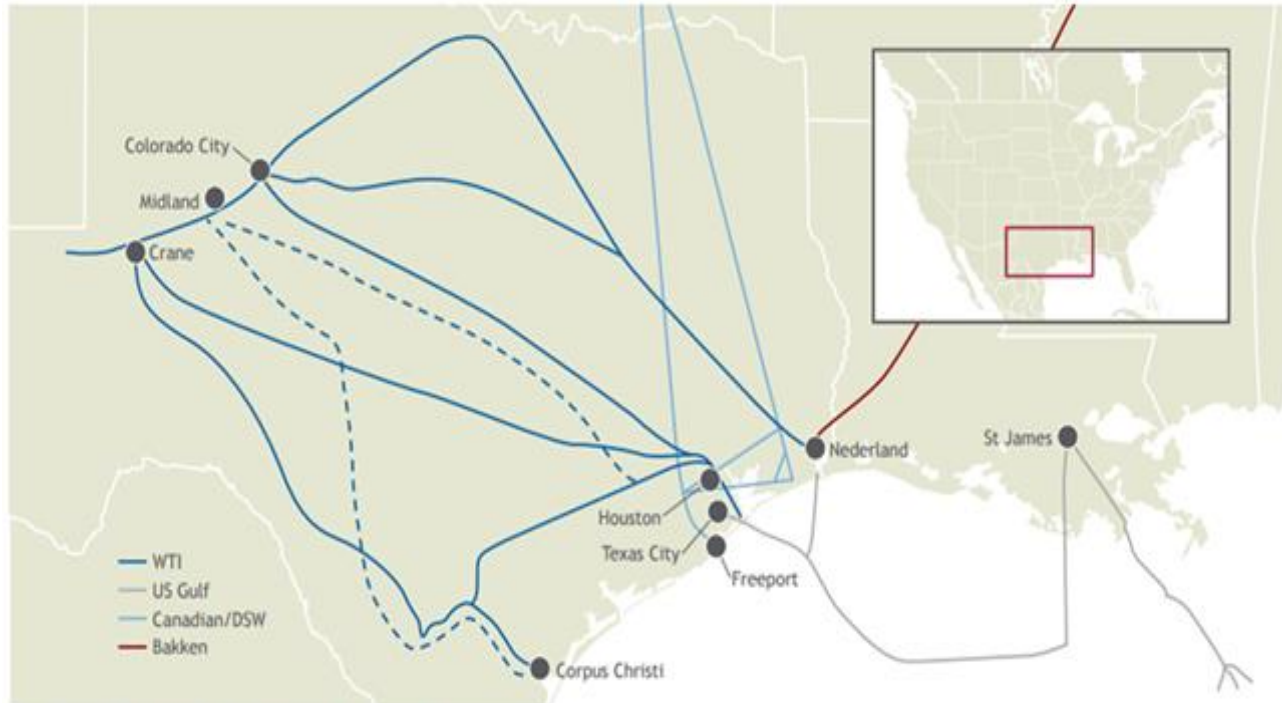


Alberta heavy oil import growth continues

Canadian Oil Imports to US versus US Oil Production and Mexican and Venezuelan Imports

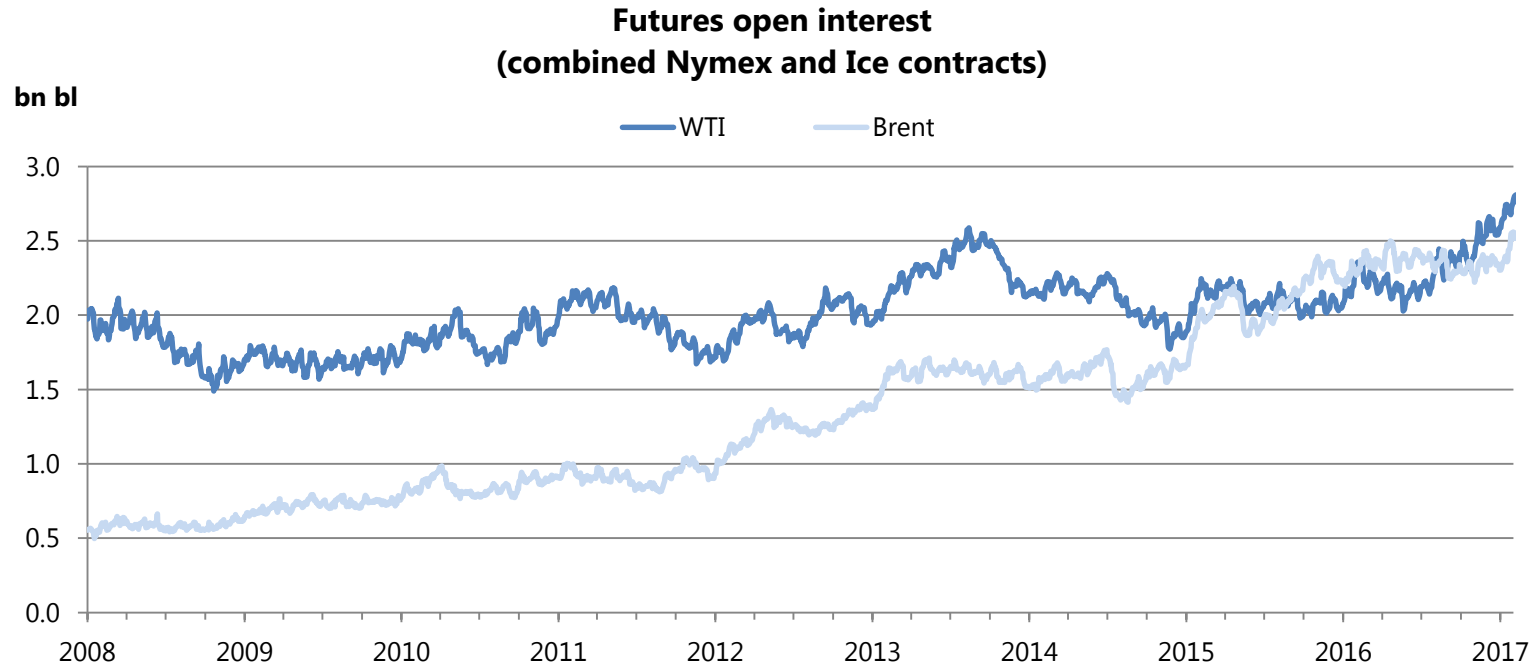


Multiple export routes safeguard liquidity during storms

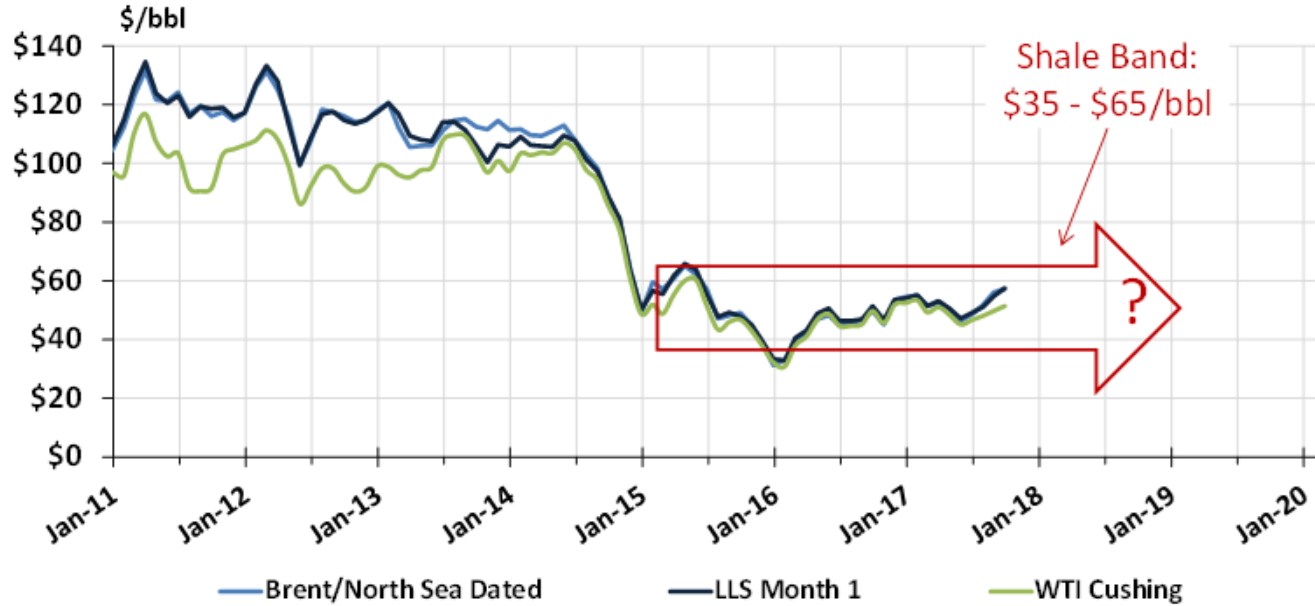


Source: Argus Petroleum Transportation

World has been turning back to WTI/US Gulf pricing



Most likely scenario – Sticking in the *shale band*



Refined product market dynamics

Supply/production

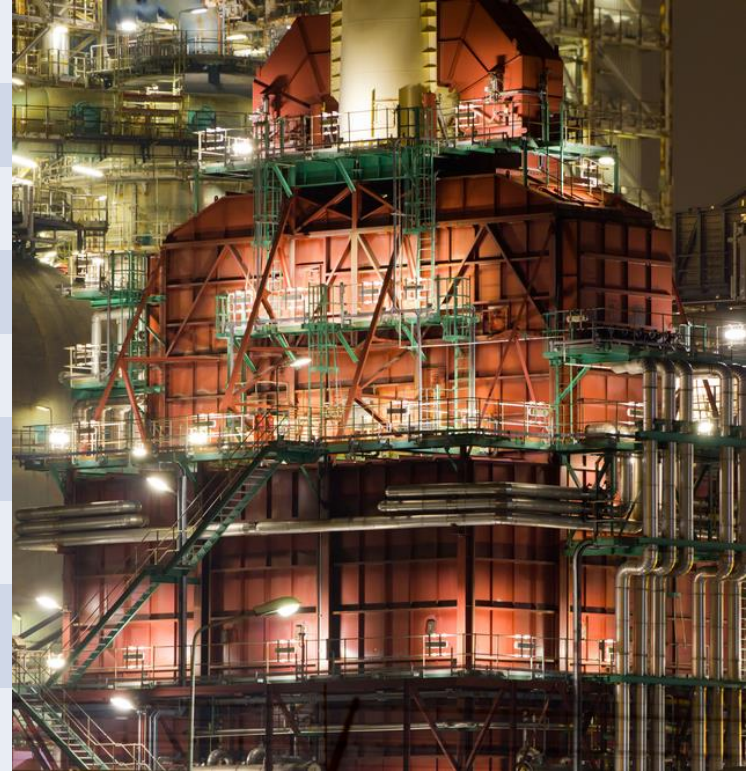
Demand

Environmental pressure

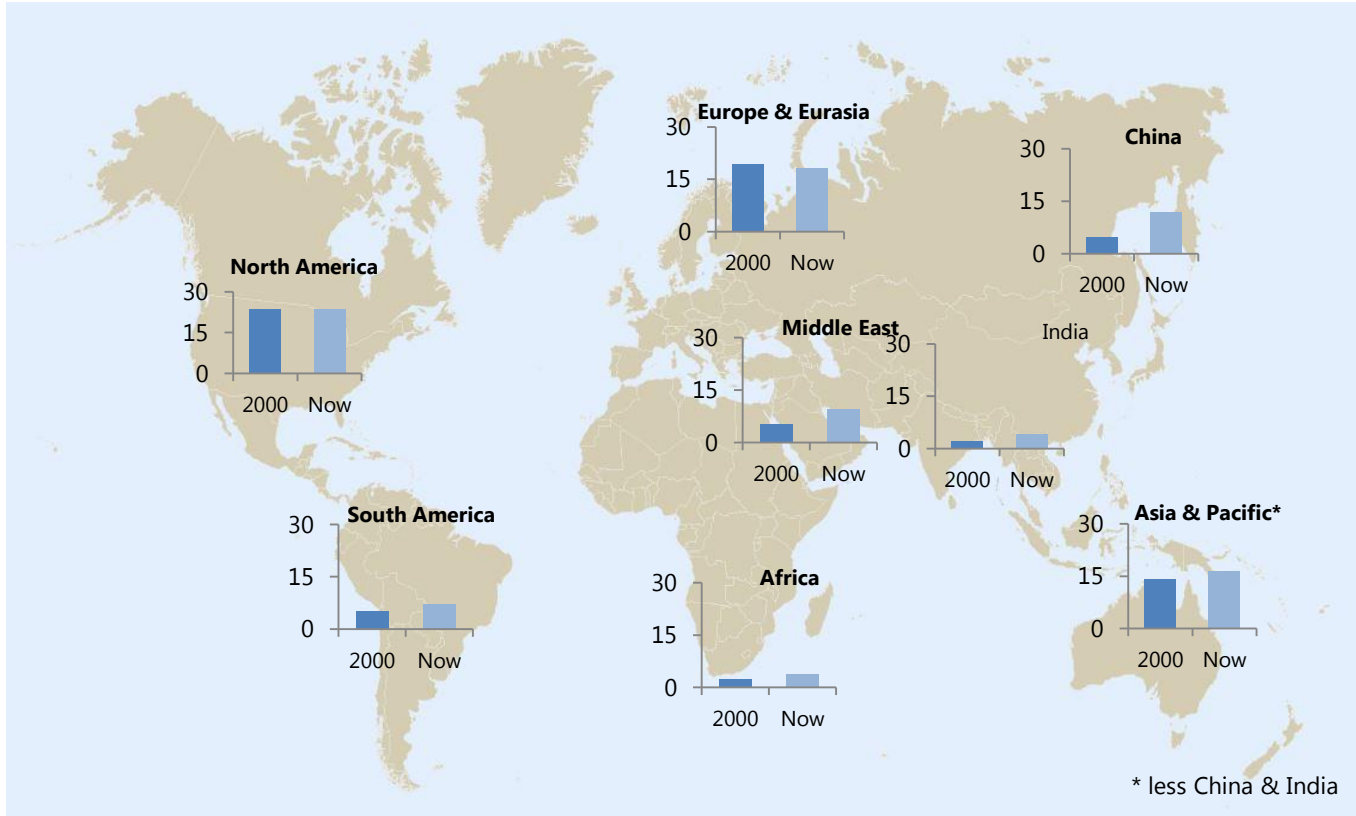
- Sulfur regulations
- Biofuels/CO2
- Café – Corporate Average Fuels

Replacements

- Alternative fuels
- Battery

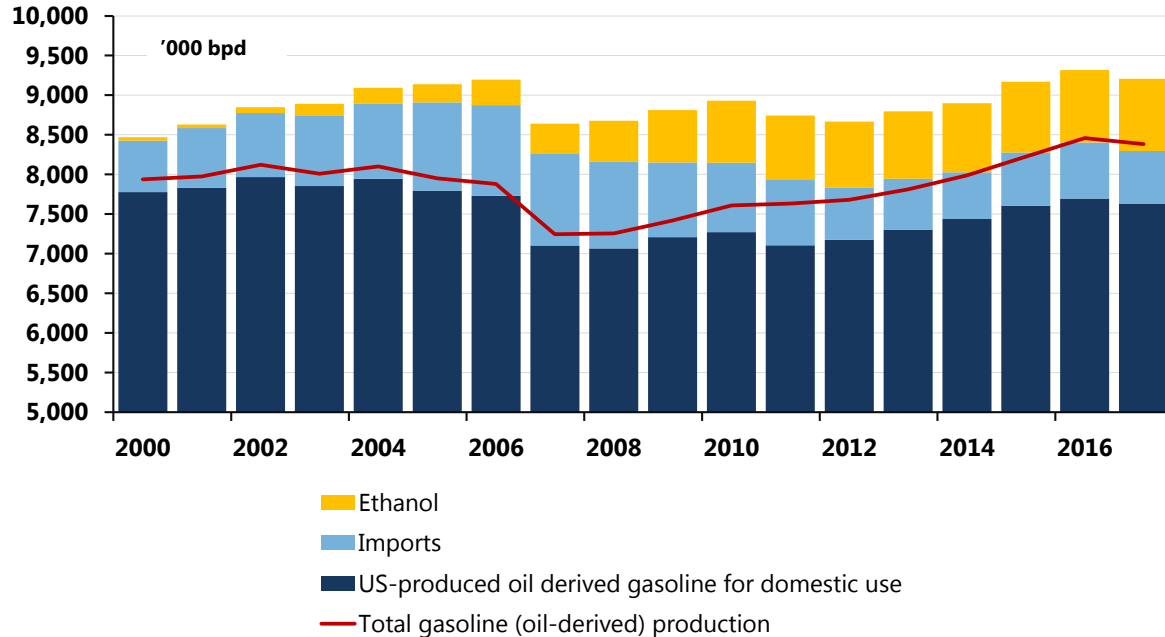


Global refining



US gasoline demand

US - Yearly Domestic Gasoline Component Demand and US Refinery Oil-Derived Gasoline Production

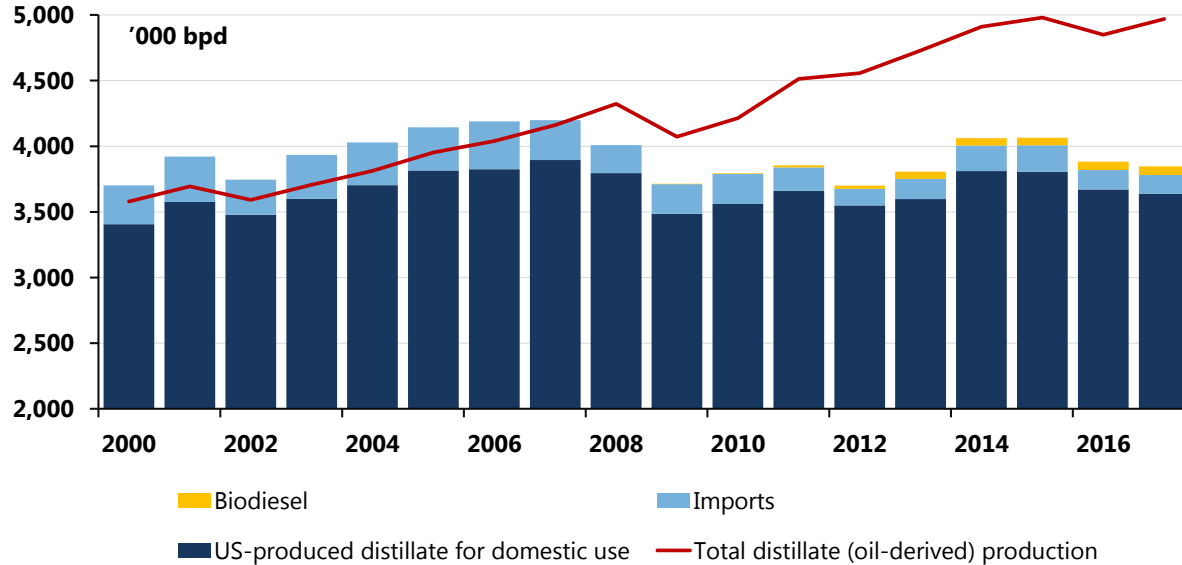


2017 data through June

-Data from EIA. Calculations by Argus.

US distillate demand

US- Yearly Domestic Distillate Demand and US Refinery Oil-Derived Distillate Production



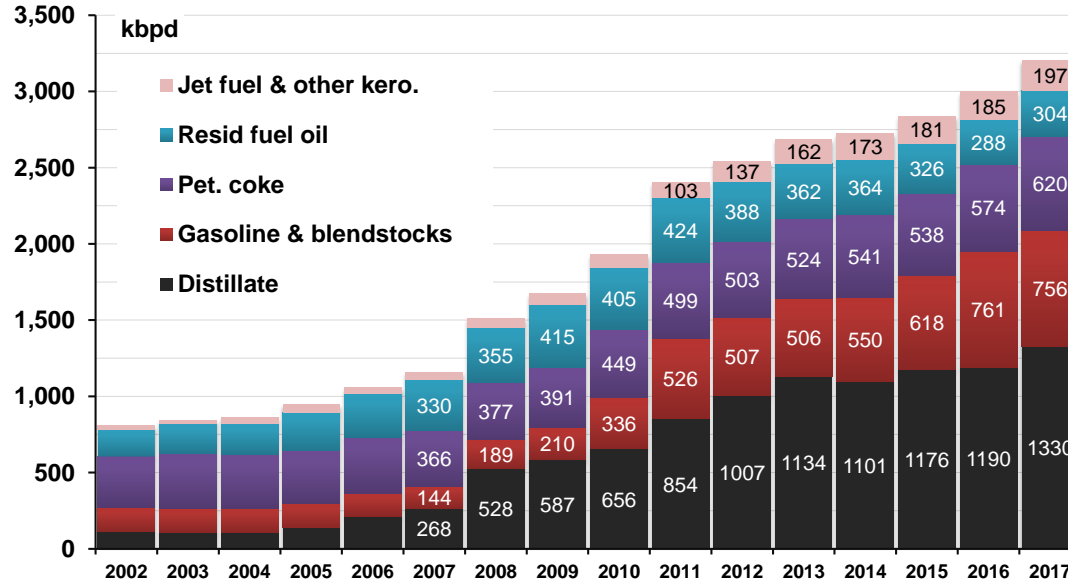
2017 data through June

-Data from EIA. Calculations by Argus.

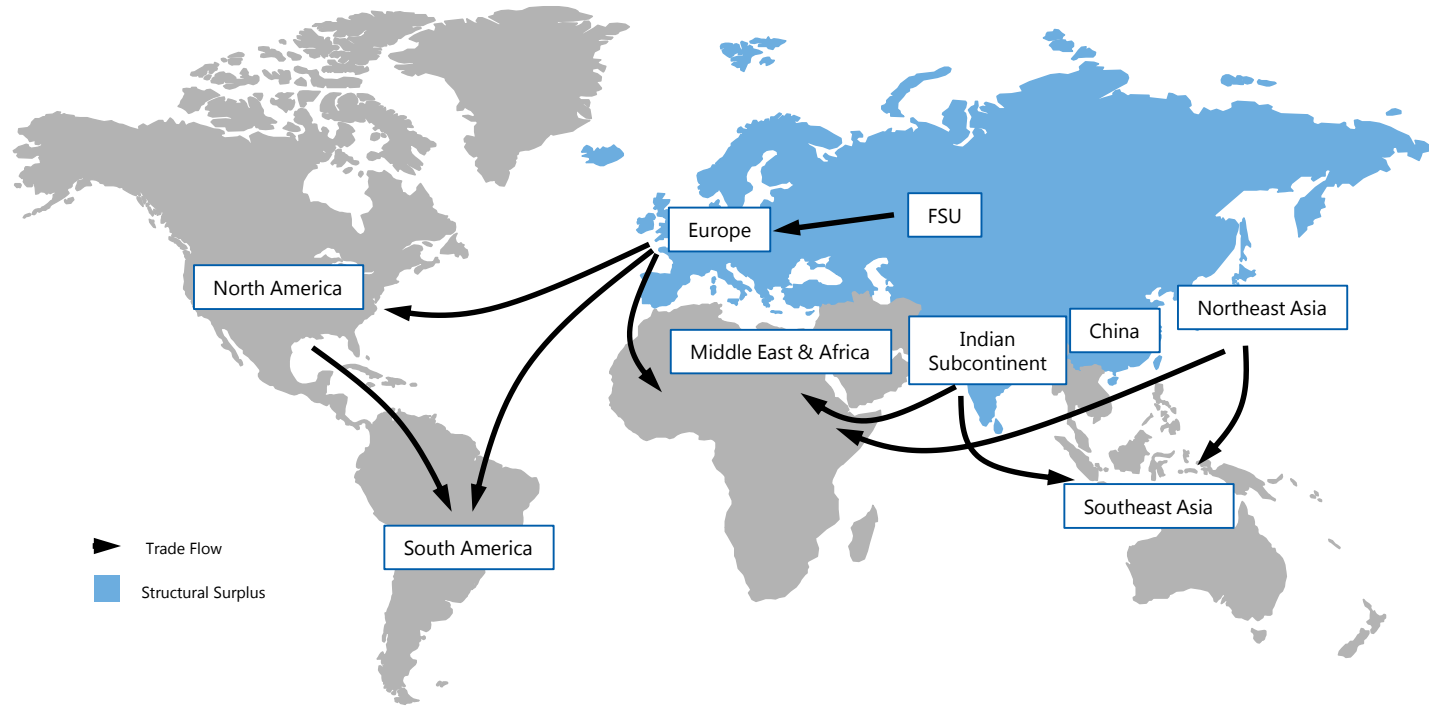
US refined products exports continue to increase

Major US Refined Product Exports

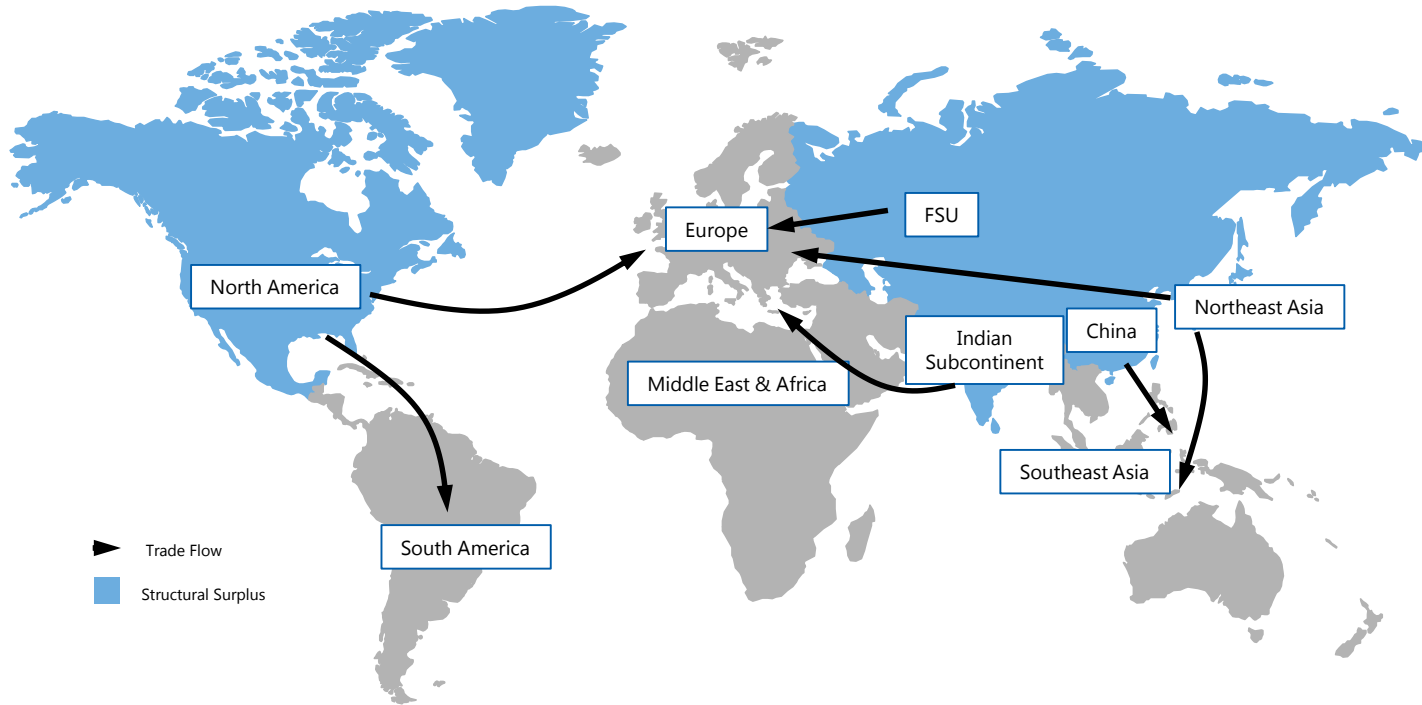
(Year 2017 values are through June)



Gasoline – Regional surplus and established trade flows



Middle Distillate – Regional surplus and established trade flows



Prospects for growth in US refining?

- **Two main sources of growth**
 - Domestic demand and exports demand
- **High level of uncertainty going forward**
 - US refined products demand growth rates
 - MARPOL VI & the Light-Heavy spread
 - RFS (RINs) and CAFE regulations (and octane requirements)
 - Export growth outlook
 - Oil prices
 - Effects of Alberta distillate surplus
 - G/D demand ratio shifts
 - Border taxes

LPG market dynamics

Global market ~300mn t/yr.... Expected 360mn t/yr by 2027

US **production** has grown 25% since 2010

US produces 25% of global production, at 67mn t/yr+

China and Saudi Arabia produce close to 10% each

US **consumes** about 20% of global production

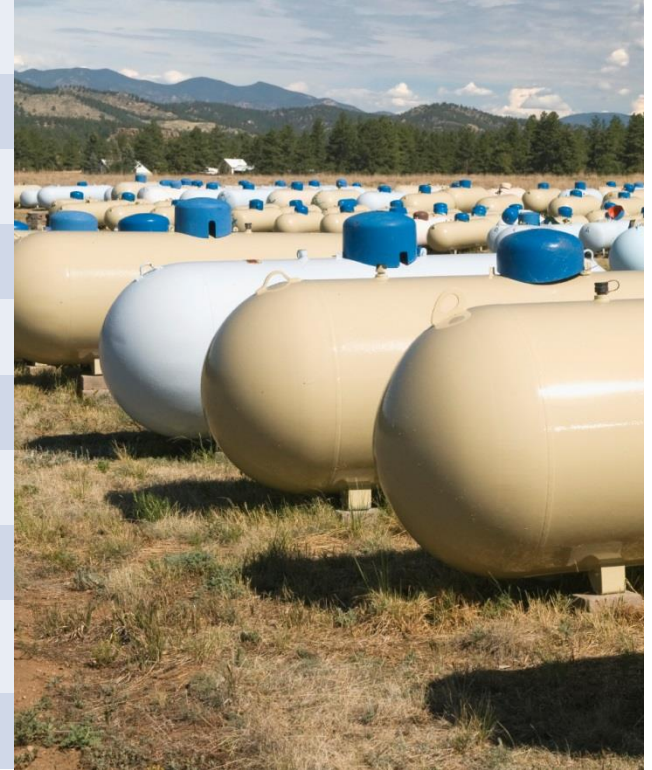
China is the next largest consumer and the fastest growing market

US became **exporter** in 2012

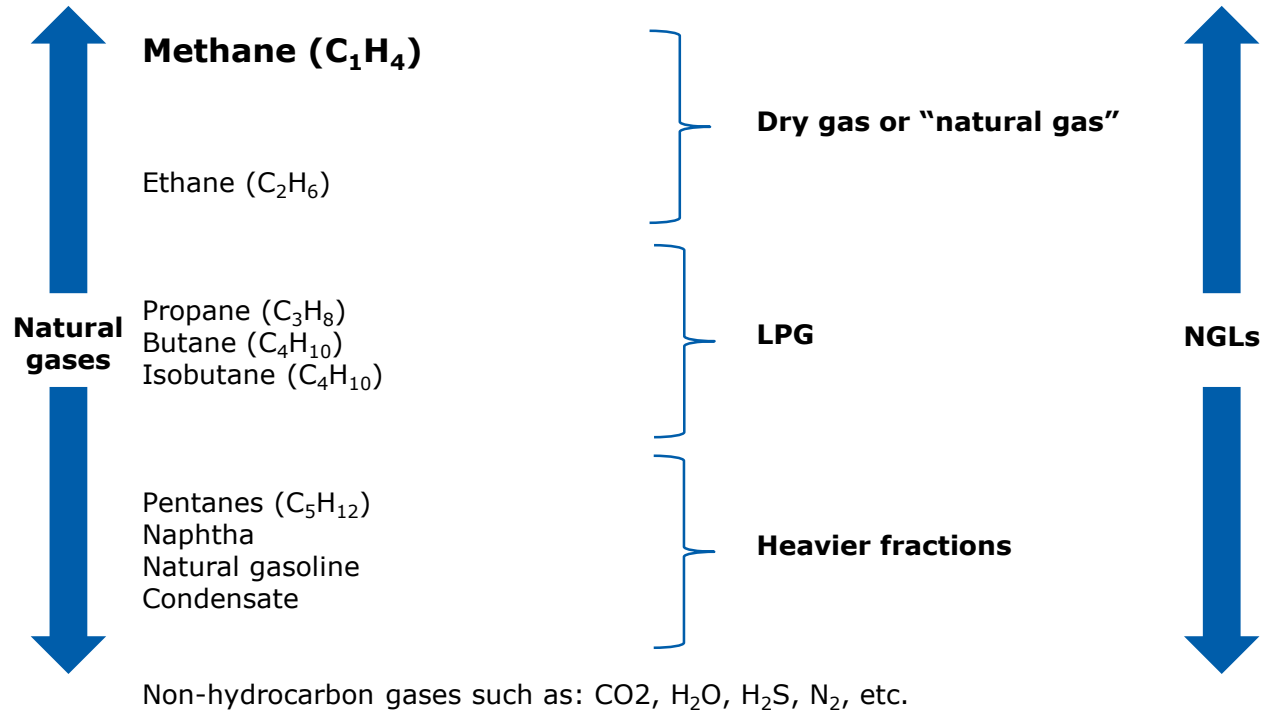
US largest global exporter; almost double to over 50mn t/yr by 2027

Consumption **growth** will depend on the energy and petrochemical markets, prices of competing feedstock like naphtha and ethane, and also subsidy regimes in Asia

Global overcapacity expected until 2020

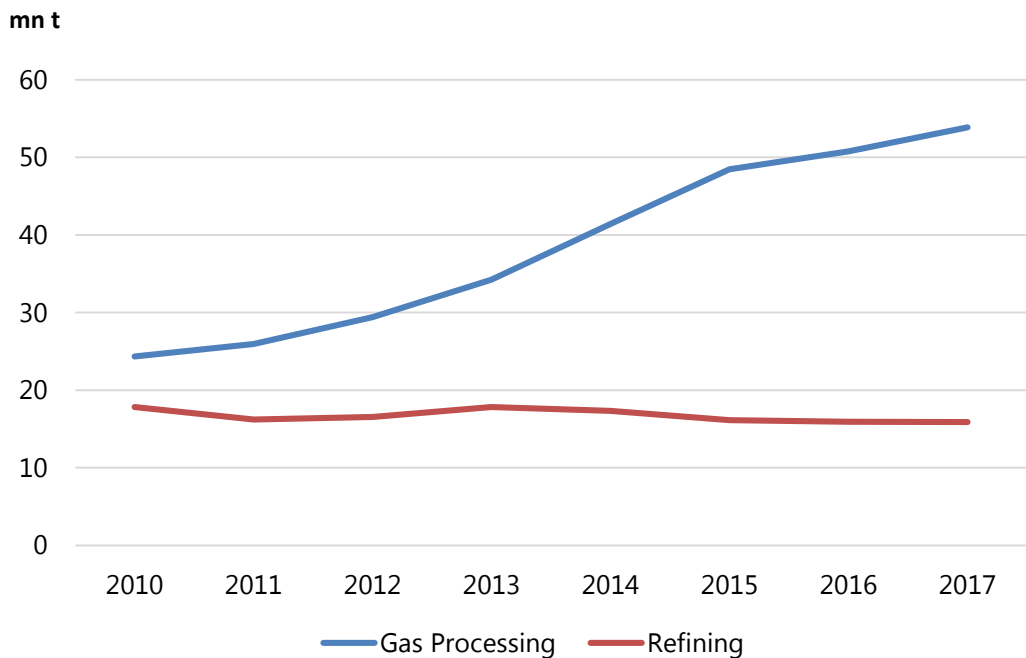


Nomenclature – Gas, LPG, NGL, propane, butane, etc.

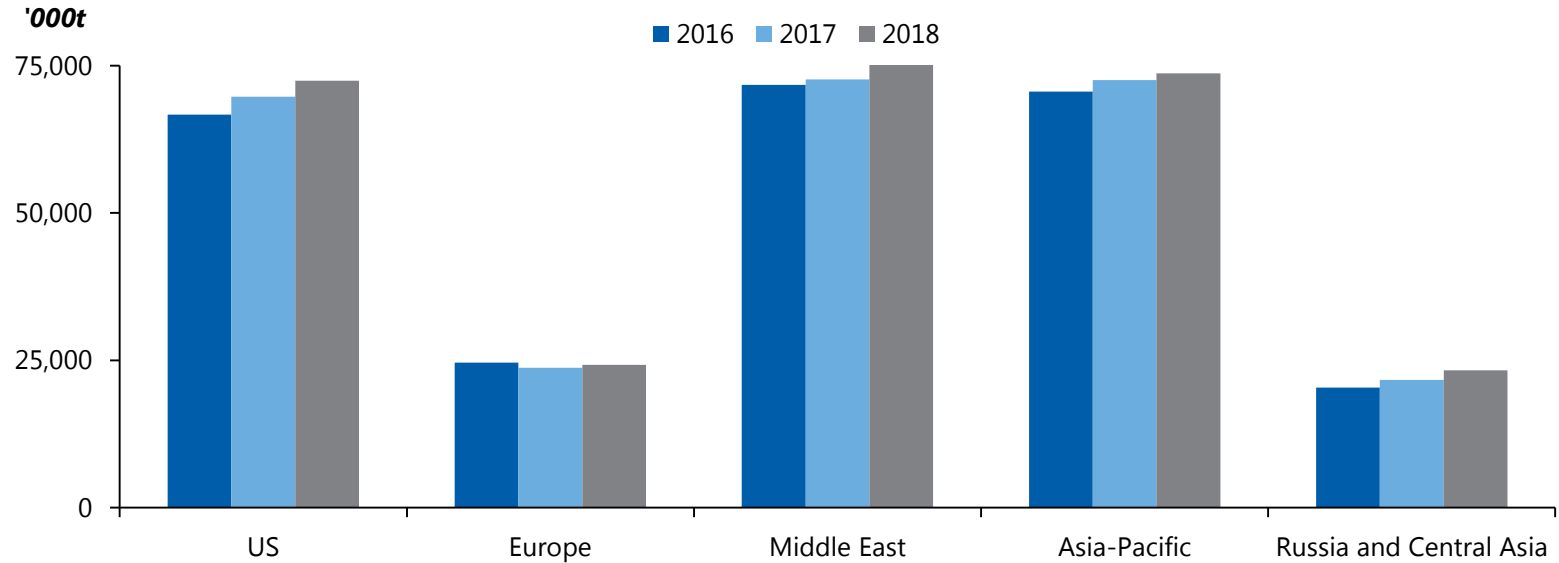


— International Energy Agency

US LPG production

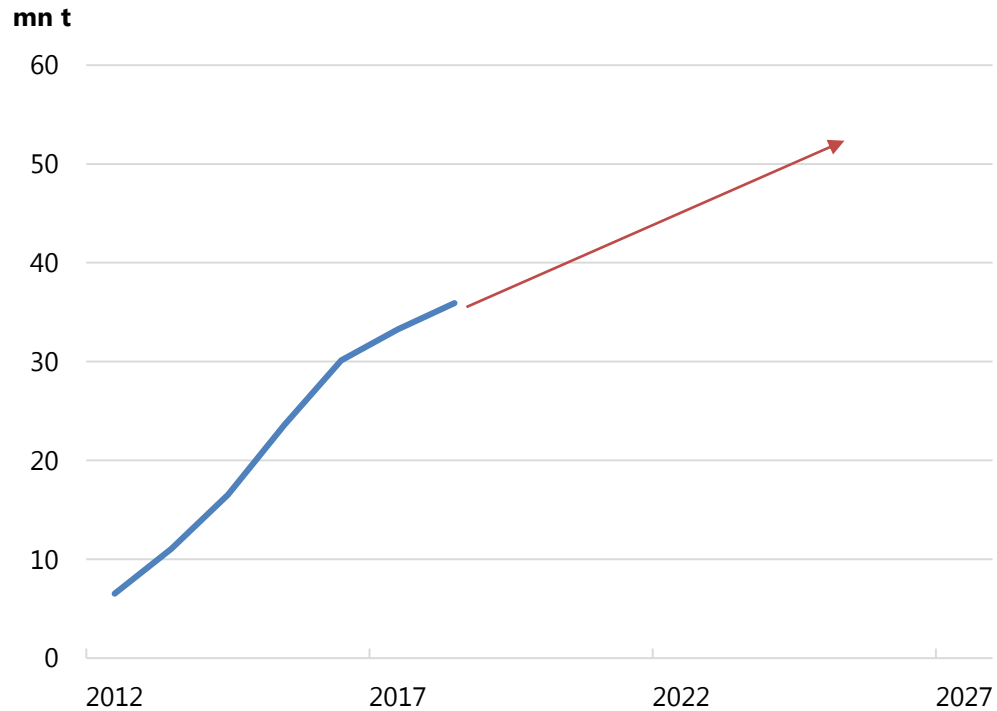


Regional LPG production

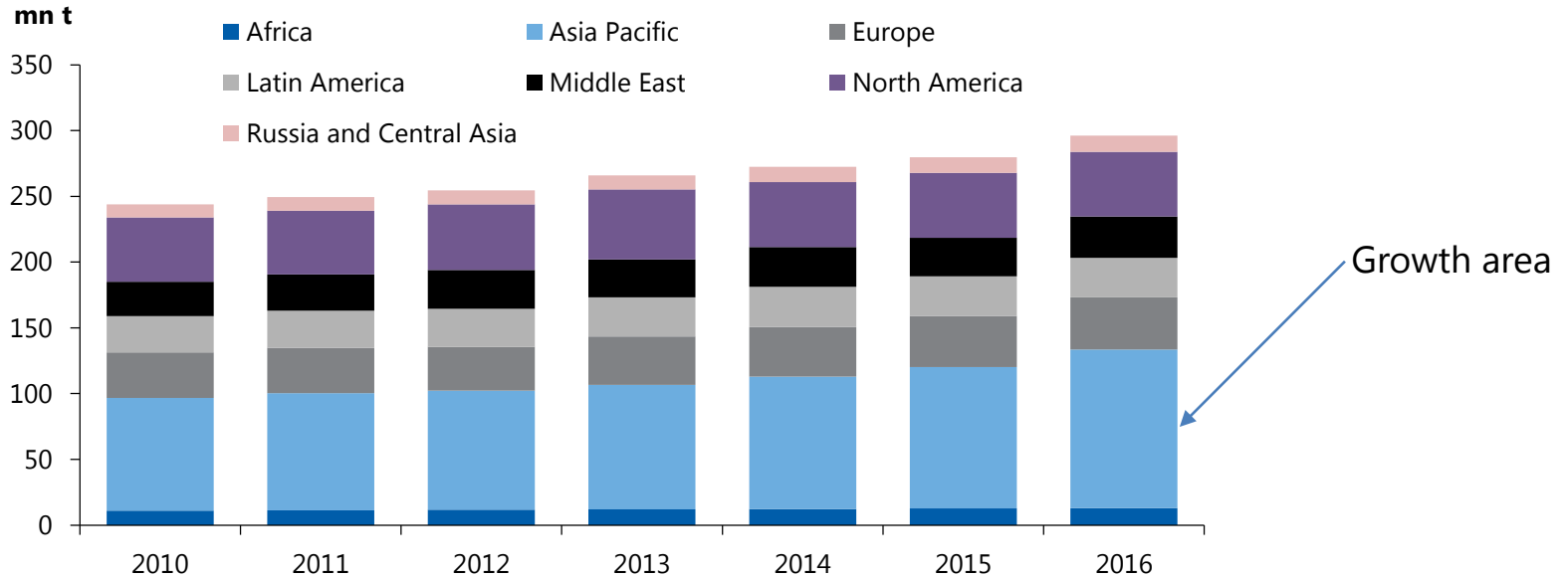


— Argus

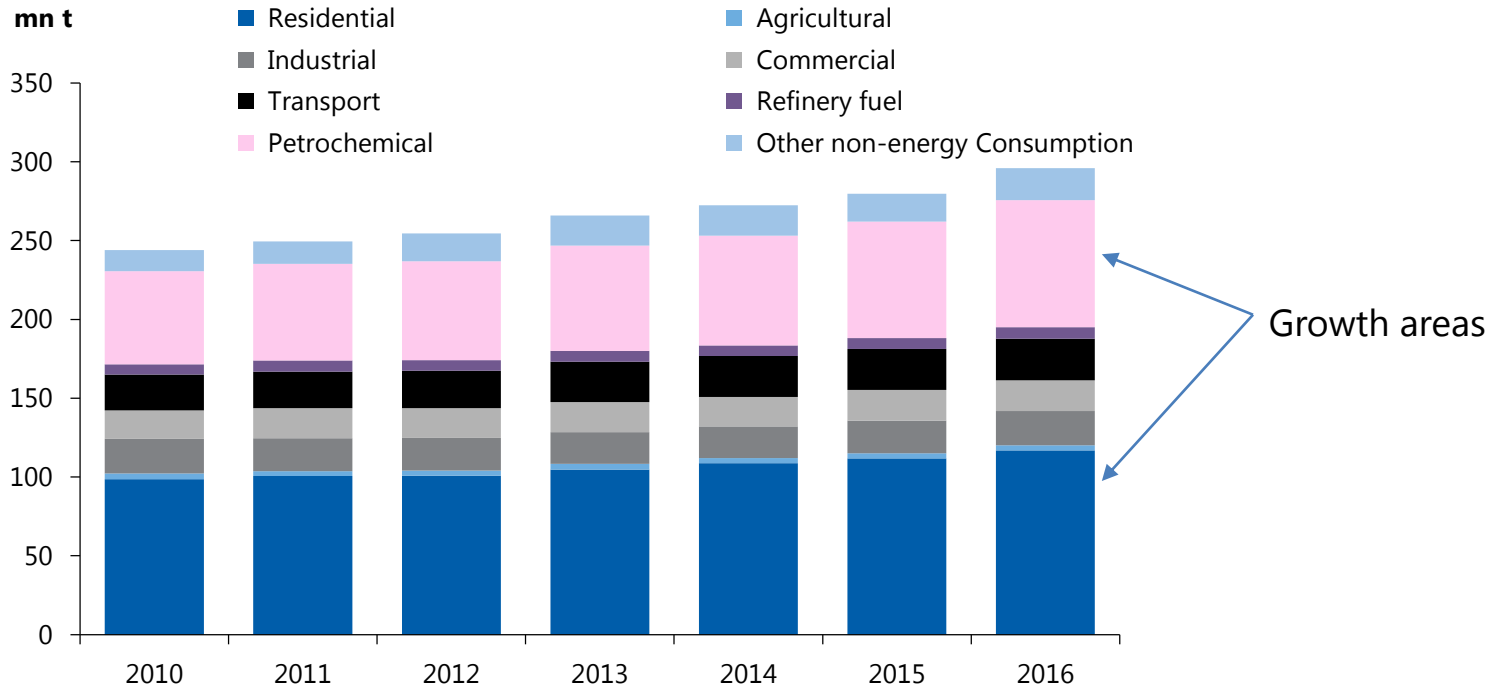
US LPG export market



Global LPG consumption

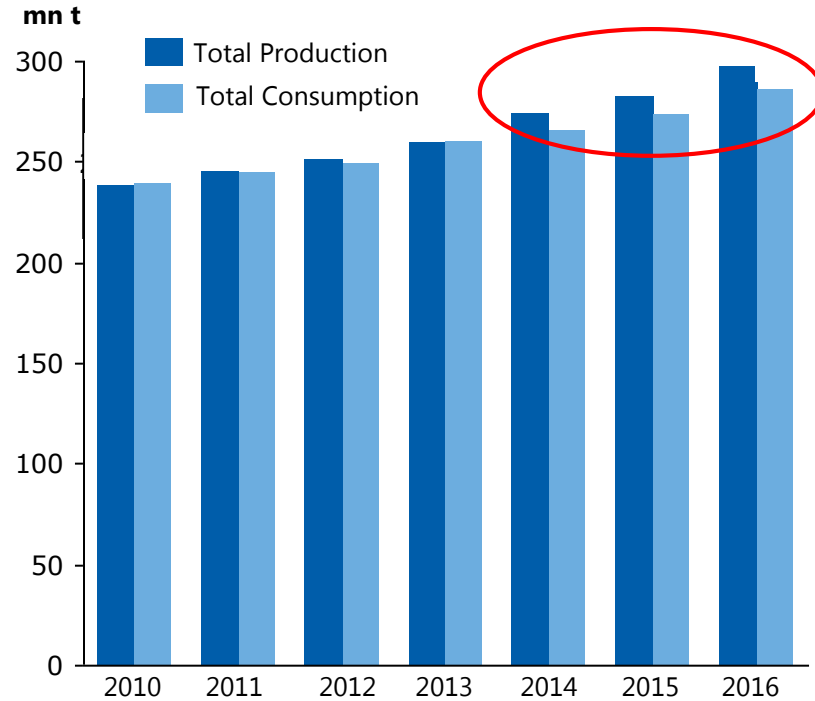


Global LPG consumption by sector



— Argus Consulting
Notes: 2016 data is provisional

Global LPG balances



— Argus Consulting
Notes: 2016 data is provisional

Prospects for LPG marketd

- Production growth will continue to come from US, but other regions will also increase.
- Demand growth will be concentrated in Asia, in both the petrochemical and energy markets.
- Structural supply will outstrip demand globally – the world will be long LPG until 2025.
- The additional length in LPG must find a home, and will price lower relative to other oil products as a result.
- Despite a significant divergence in the net position of each region, the global surplus will prevent sustained arbitrages emergence.
- Trade flows will follow seasonal/temporary patterns.
- Post 2025 should see a rebalancing, which might effect LPG pricing.



In summary



- Continued growth in demand, of all products
- Shift in demand centers and trade flows
- Peak demand
- China
- MARPOL
- Petrochemicals

THANK YOU!

Email: kristine.klavers@argusmedia.com
Phone: +1 713 400 8760
Office: Houston, Texas
Web: www.argusmedia.com, www.argusmedia.com/consulting

Stay Connected

 @ArgusMedia
 +Argusmediaplus

 Argus-media
 argusmediavideo

Copyright notice

Copyright © 2017 Argus Media group. All rights reserved. All intellectual property rights in this presentation and the information herein are the exclusive property of Argus and and/or its licensors and may only be used under licence from Argus. Without limiting the foregoing, by reading this presentation you agree that you will not copy or reproduce any part of its contents (including, but not limited to, single prices or any other individual items of data) in any form or for any purpose whatsoever without the prior written consent of Argus.

Trademark notice

ARGUS, the ARGUS logo, ARGUS MEDIA, ARGUS DIRECT, ARGUS OPEN MARKETS, AOM, FMB, DEWITT, JIM JORDAN & ASSOCIATES, JJ&A, FUNDALYTICS, METAL-PAGES, METALPRICES.COM, Argus publication titles and Argus index names are trademarks of Argus Media group.

Disclaimer

All data and other information presented (the "Data") are provided on an "as is" basis. Argus makes no warranties, express or implied, as to the accuracy, adequacy, timeliness, or completeness of the Data or fitness for any particular purpose. Argus shall not be liable for any loss or damage arising from any party's reliance on the Data and disclaims any and all liability related to or arising out of use of the Data to the full extent permissible by law.