U.S. Refined Product Exports

Developments, Prospects and Challenges

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U.S. Moves from Importer to Exporter*

2005

Exporters

1:	Russia
2:	Kuwait
3:	Saudi Arabia
4:	Venezuela
5:	Algeria

Importers

1:	U.S.	2455 MBPD
2:	Japan	
3:	Spain	
4:	China	
5:	Indonesia	
11:	Mexico	

2016

Exporters

1:	U.S.	2487 MBPD
2:	Russia	
3:	Saudi Arabia	
4:	UAE	
5:	India	

Importers

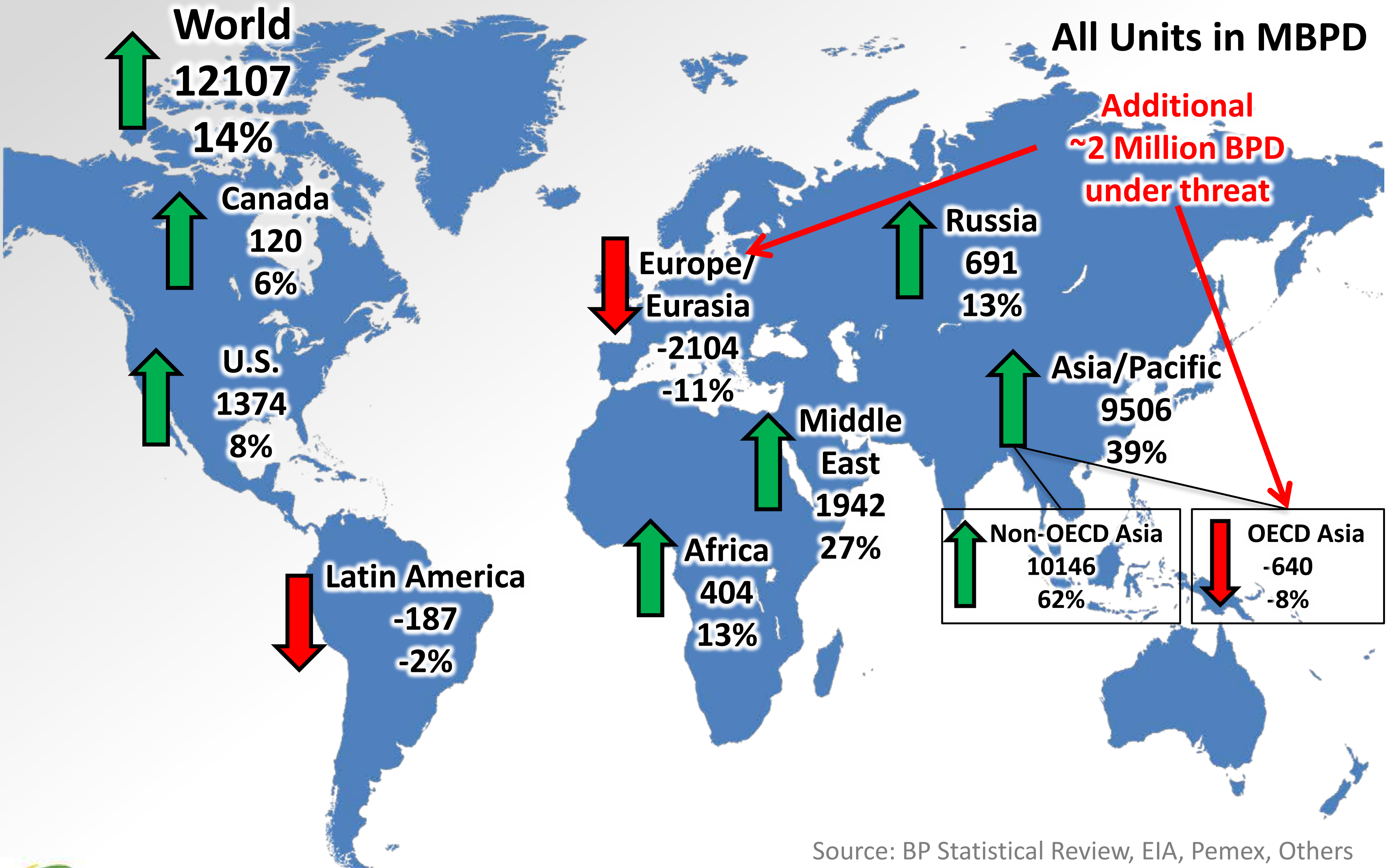
1:	Japan
2:	Singapore
3:	Mexico
4:	Australia
5:	Indonesia
6:	Brazil

*imports/exports on net basis

Source: EIA/IEA/Pemex/JODI

Global Refining Capacity Shifts

2005-2016



Source: BP Statistical Review, EIA, Pemex, Others

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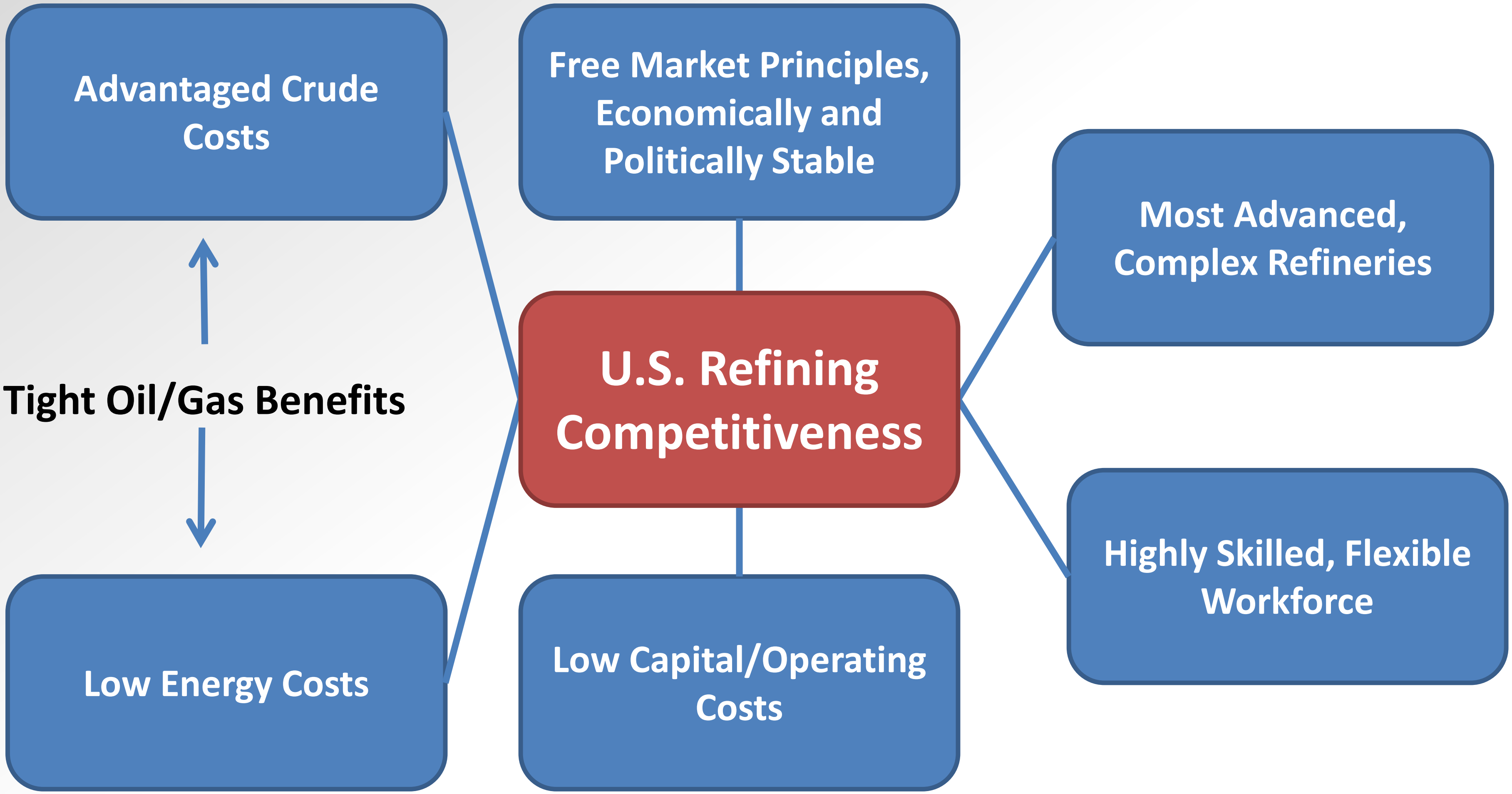
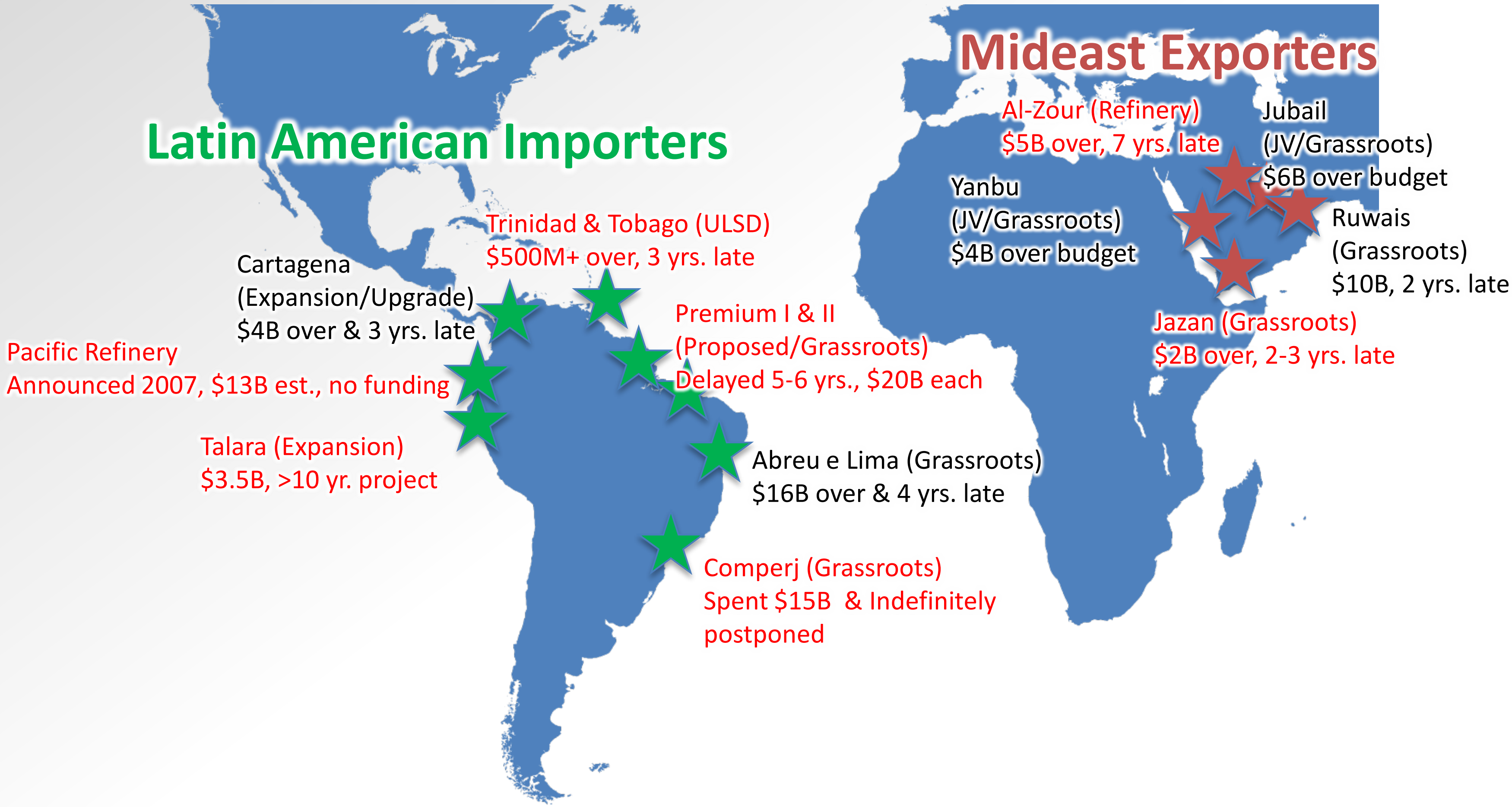
Drivers of U.S. Competitiveness



Foreign Refinery Projects Have Been Troubled



Global Refining Utilization

2016

Source: BP Statistical Review, EIA, Pemex, Others

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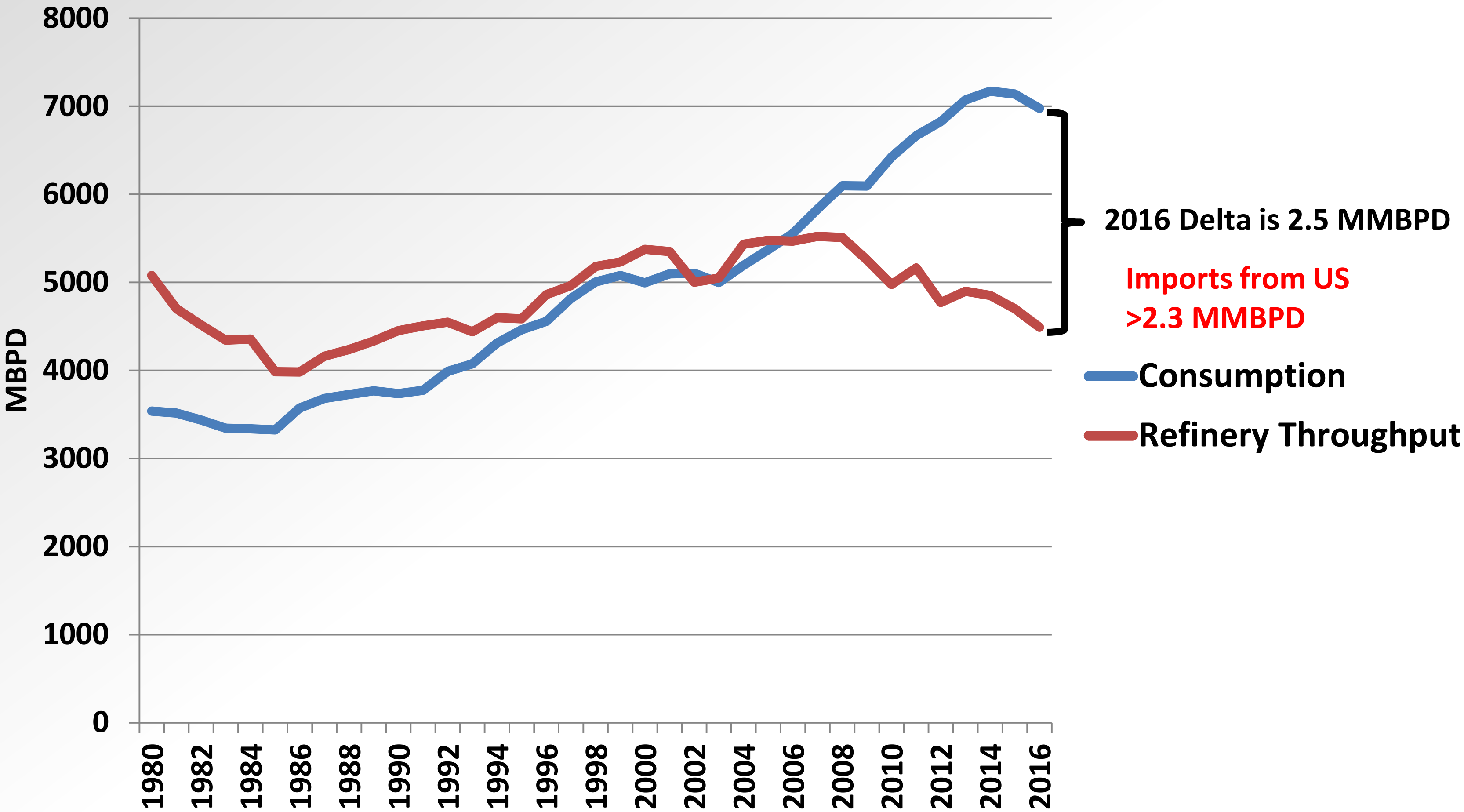
US Refiners Take Advantage of LatAm Troubles



Source: BP Statistical Review, EIA, Pemex, Others

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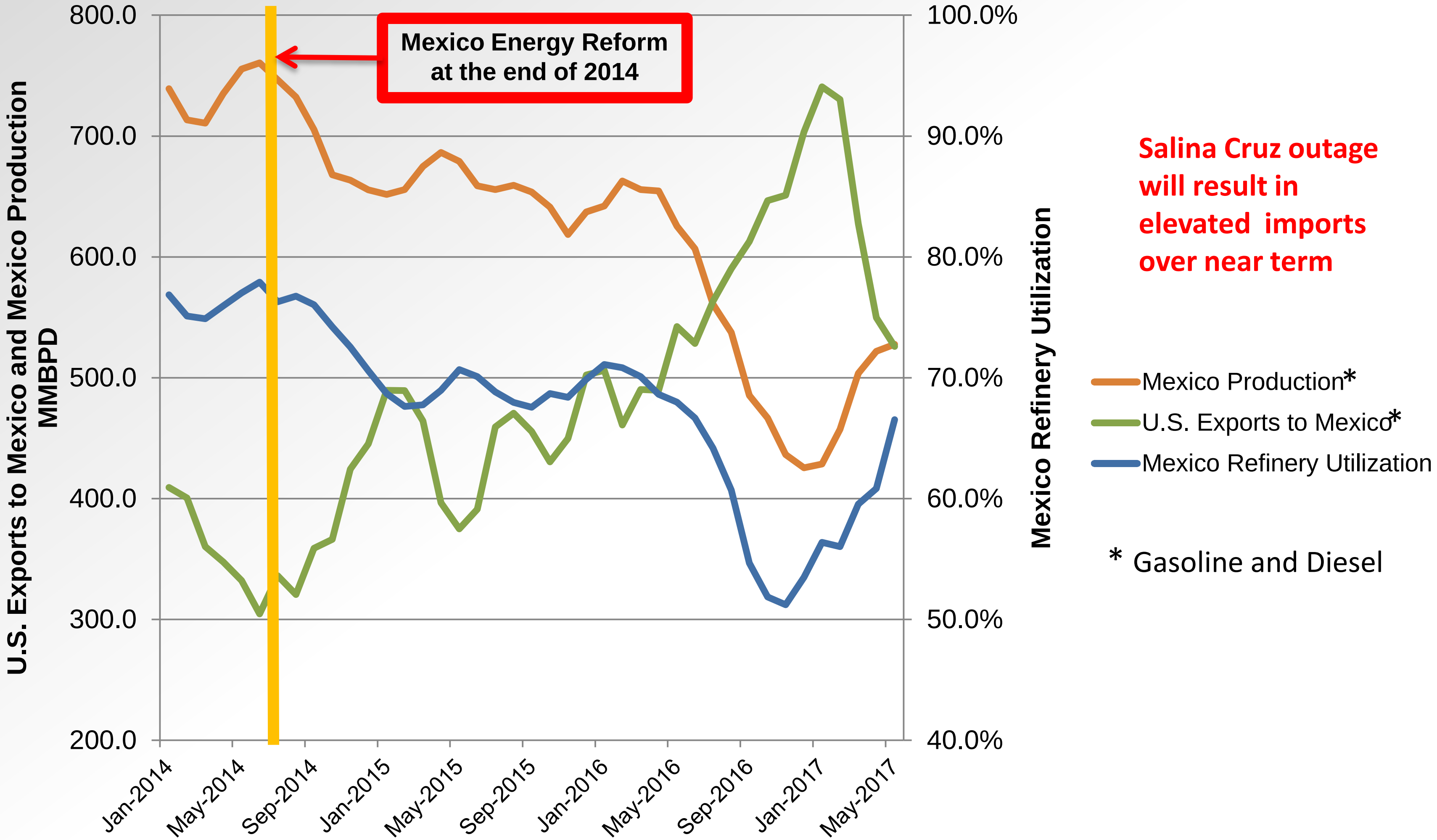
Mexican Reform Has Led to More Imports



Source: BP Statistical Review, EIA, Pemex, Others

U.S. Gulf Coast (PADD III) vs. Mexico Refineries

Mexico	U.S. Gulf Coast
# of Refineries: 6	# of Refineries: 43*
Total Capacity: 1540 MBPD	Total Capacity: 9140 MBPD
Average Size: 257 MBPD	Average Size: 213 MBPD
Total Coking: 156 MBPD, 10%	Total Coking: 1625 MBPD, 18%
Total Cracking: 423 MBPD, 27%	Total Cracking: 3095 MBPD, 34%
Total Hydrocracking: 0 MBPD, 0%	Total Hydrocracking: 1260 MBPD, 14%
Total Upgrading: 579 MBPD, 37%	Total Upgrading: 5980 MBPD, 66%
Crude Runs: 943 MBPD	Crude Runs: 8390 MBPD
Utilization: 61%	Utilization: 91%
Yields: Gasoline 35%, Diesel 24%	Yields: Gasoline 52%, Diesel 32%
# of Employees/MMBBL: 28,000	# of Employees/MMBBL: 3000-7000

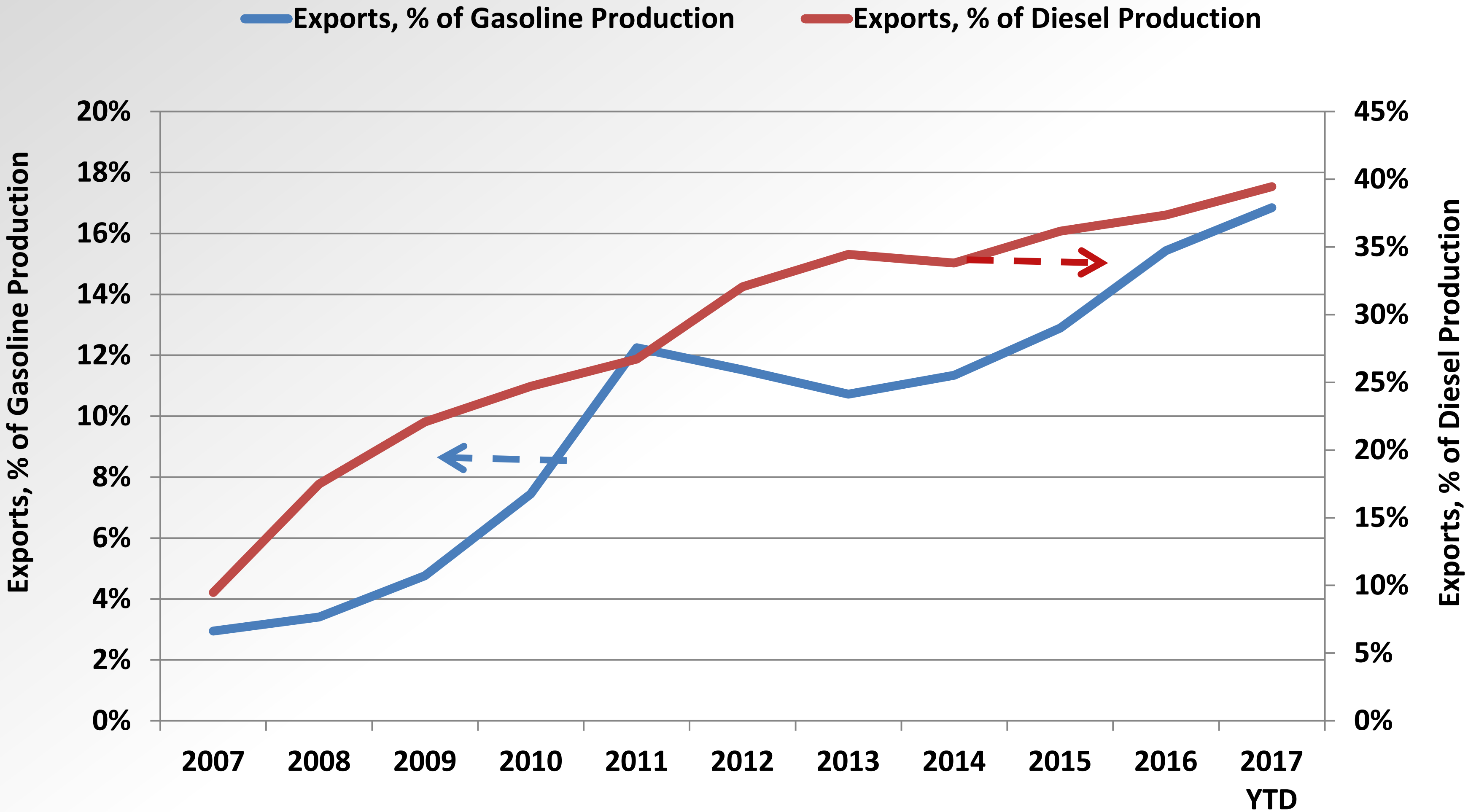
Source: EIA, PEMEX

*Refineries >35 MBPD

Future Challenges

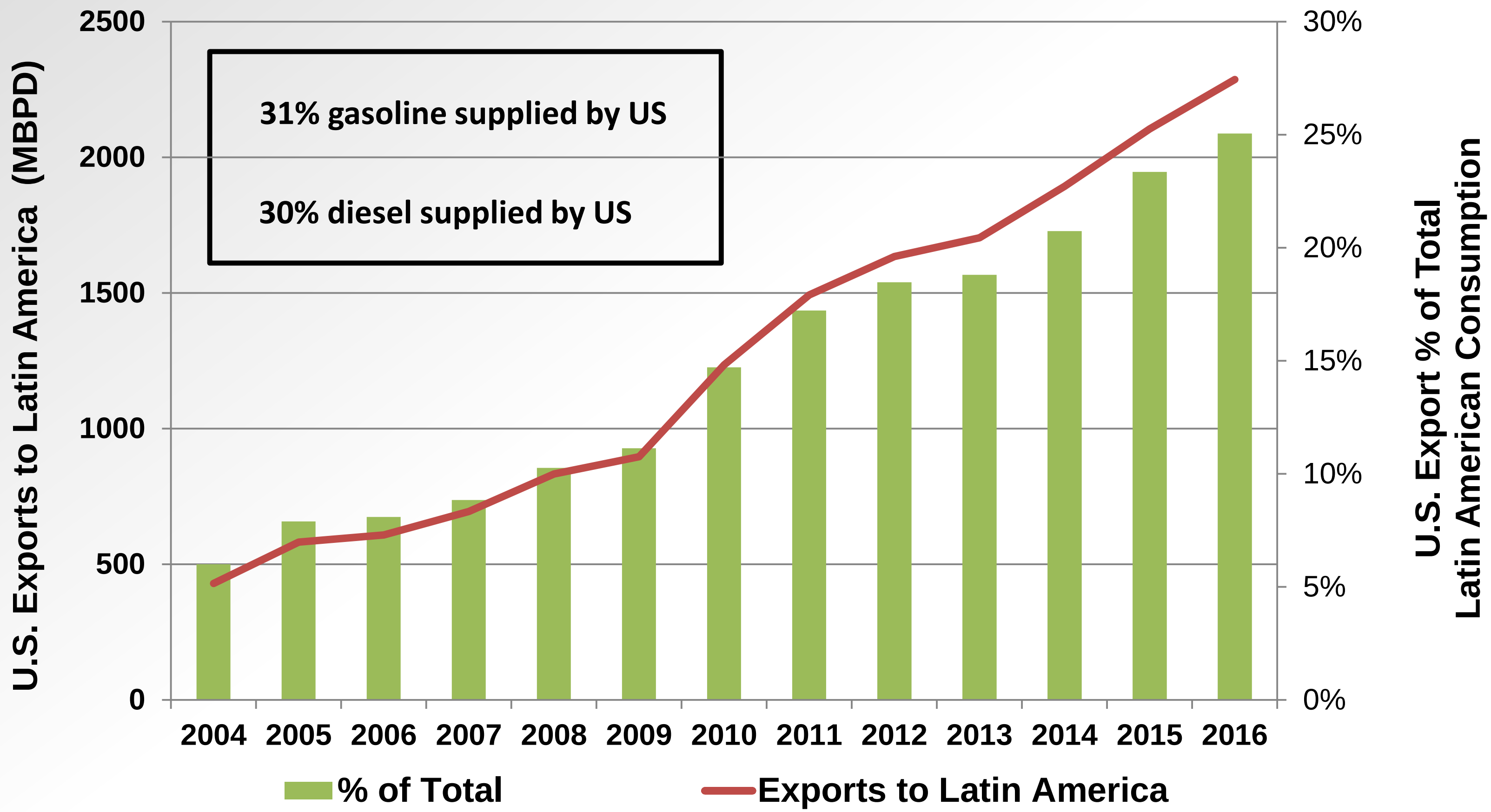
- Market Issues
  - Growing dependency on export markets
  - Market saturation in traditional markets; will have to extend reach to markets where U.S. has fewer advantages/more competition
  - Risk of global refining capacity overbuilding
    - Importing countries – Asia/LatAm/Africa and exporting countries - ME/India/Russia
- Demand Growth – Both Domestic and Global
- Competition From Alternatives
  - Direct substitutes – biofuels/CNG/LNG/CTL/GTL
  - Move to Electrical Vehicles (EV's)
- Regulations
  - Stifle demand/increase costs/limit access/distort markets
  - Increased regulation in other regions can advantage U.S. refiners
    - Tighter fuel specifications in developing countries provide opportunities
    - IMO LS Bunker rules (2020) will be a substantial boost

USGC Increasing Dependency on Exports



Source: EIA

LatAm Market Approaching Saturation?

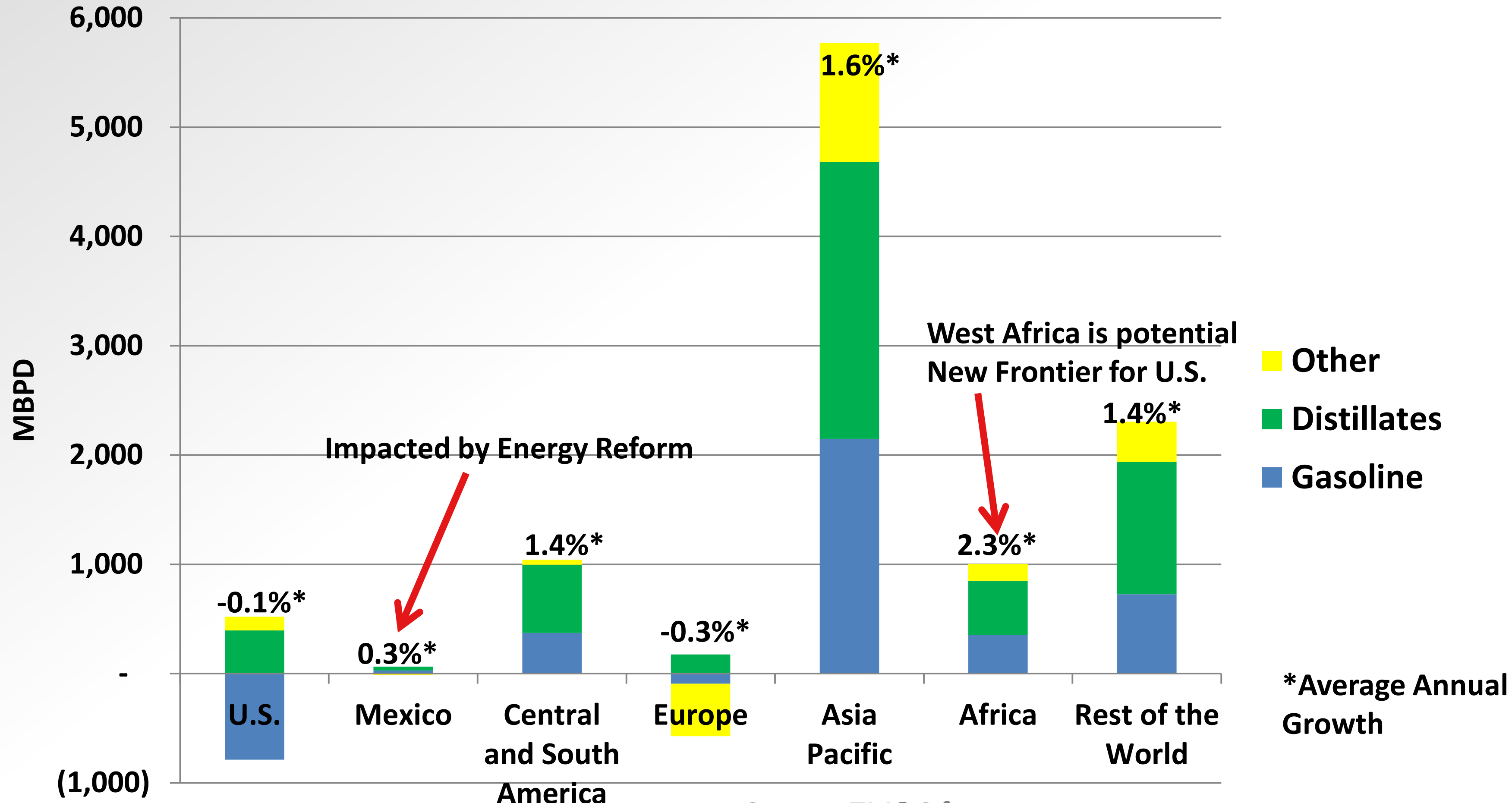


Source: BP Statistical Review, EIA, Pemex, Others

Global Demand Growth

2016 to 2025

Global Annual Growth (MBPD)				
Gasoline	Distillates	Other	Total	%
2,751	5,466	1,293	9,510	0.9%



Source: TM&C forecast

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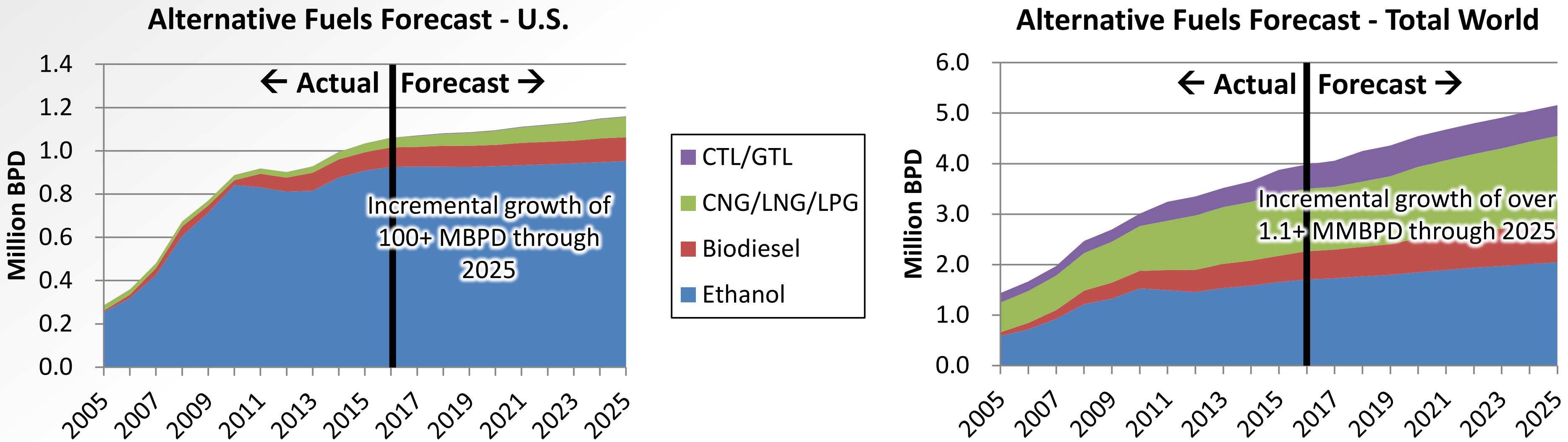
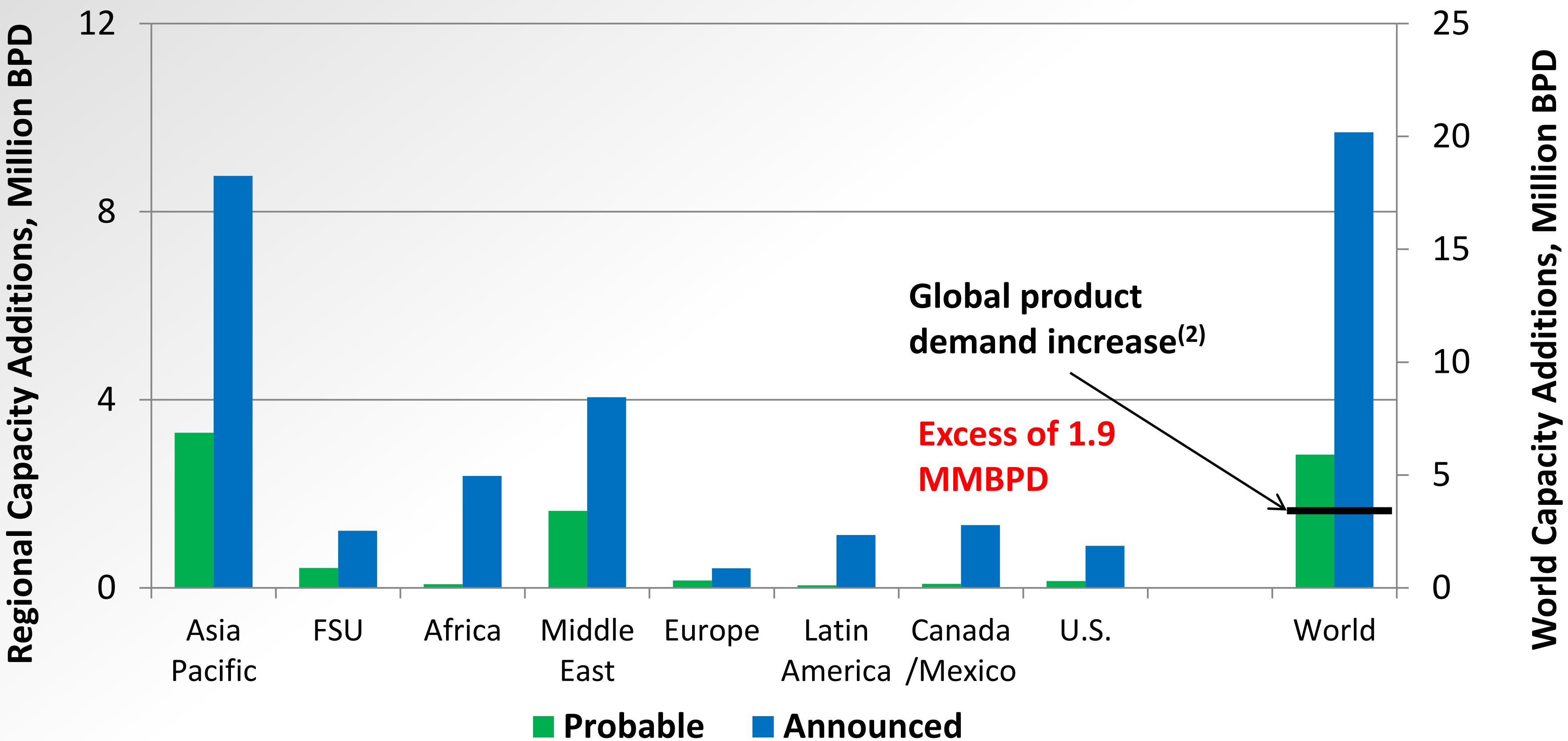
Alternate Fuels Impact Limited Thru 2025

- Low oil prices have made alternatives less attractive
  - Growth has/will be driven by regulatory action
- Essentially all growth in the U.S. has been ethanol
  - limited additional room due to “blend wall”
- EV replacement of gasoline vehicles difficult to predict
  - TM&C doesn’t expect significant penetration before 2025
  - Longer term, Autonomous Vehicle (AV) introduction could be game changer



Source: EIA, TM&C forecast, Others

Global Crude Capacity Additions 2017-2021[1]



(1) Adjusted for utilization

(2) Adjusted for non-petroleum fuels

Source: TM&C forecast

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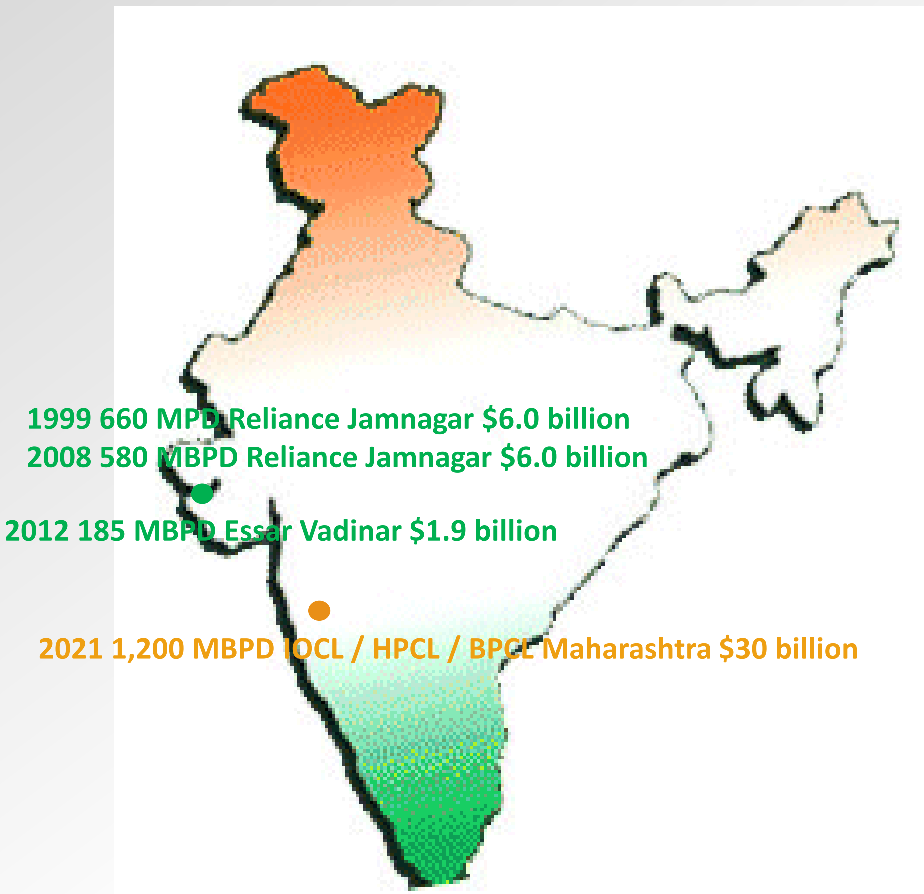
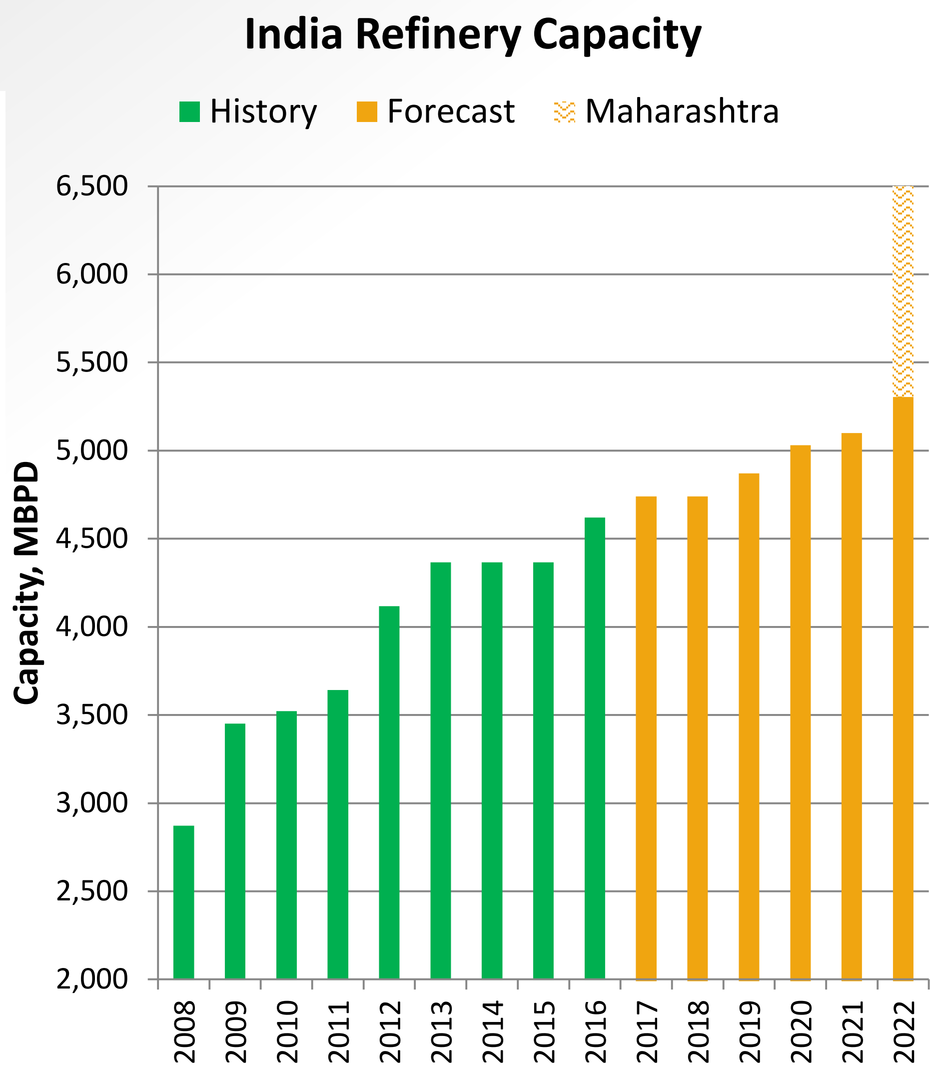
An Exception: Indian Refining Success





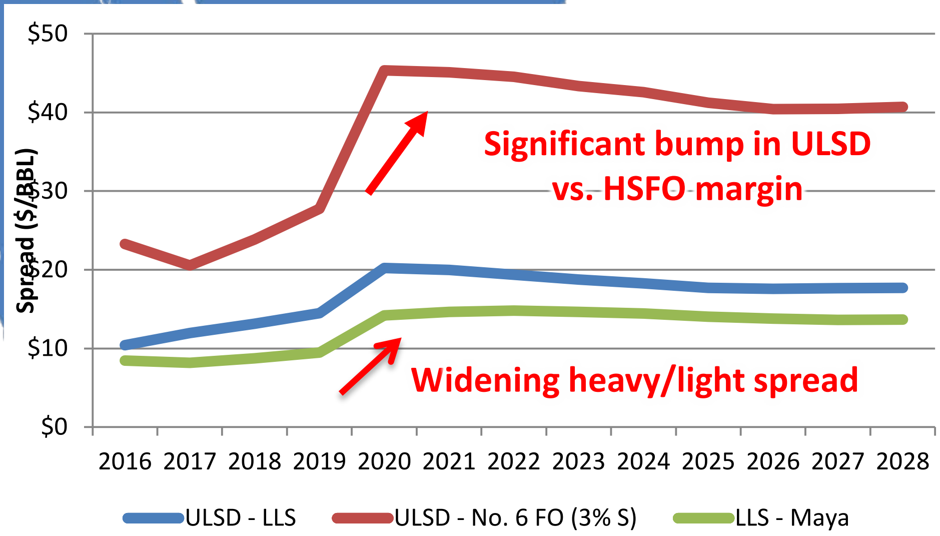
Source: TM&C forecast, Others

2020 LS Bunker Will Advantage U.S. Refiners

U.S. Refineries – Limited FO production
Most refiners will benefit from: higher distillate cracks/wider heavy crude discounts

TM&C estimates that 1.2 to 2.0 Million BPD of fuel oil will be displaced by lighter streams, especially distillates.

Europe and Asia - greater fuel oil production/simpler refineries. Impacts most significant for privately-owned European plants



Source: TM&C forecast

Final Words

- U.S. Should Continue to Be World Leader in Refining
  - Ability to maintain and grow product exports will be critical (esp. for USGC)
  - Challenged by new refining capacity in both importing/exporting countries
  - Important not to be handicapped by excess regulation
  - Benefits of domestic production growth are real; limited by removal of crude export restrictions
  - **Can expect more rationalization of capacity in OECD Europe/Asia**

- Export Product Demand Growth will Continue but Slow
  - Market limitations/slowing world petroleum demand growth
  - U.S. Capacity/Throughput increases limited; based on export economics
  - With domestic demand declining, growth will be needed to sustain rates
  - Should capture incremental LatAm growth and compete for West African
  - Asian market will be a challenge due to competition and high transit costs
  - **U.S. product exports can reach/exceed 6 million BPD by 2025**

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