KBC ADVANCED TECHNOLOGIES
Proprietary Information
27 April 2016

Crude Export and the New Dynamics

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SUPERIOR RESULTS. **SUSTAINED.**

Topics of Interest

- Crude Export Impact – "*The Great Divide*"
- Export to everywhere
- The US Advantage

Impact of Lower Crude Pricing

“The Great Divide”

Global Market – History

The Perfect Storm

Saudi Arabia no cut in November of 2014

The explosion of LTO incentivized refiners to process LTO

West African crudes need a new home

Reality – since Iran sanctions in mid 80s, Saudi had risen to power. Without the sanctions Iran takes market from Saudis.

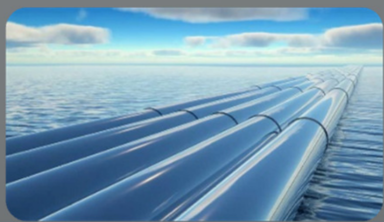
Push out like-for-like crude most notably West African crude.

Asia becomes new home to sell crude, West African crude.

This is more about market share than price of crude

In December 2015 as part of the Congressional budget deal, the 40 year crude export ban is lifted.

Canada Crude – Southward Ho



West and East pipeline projects are in jeopardy

- Environmental challenges abound in each direction
- East flows are coming through US via Line 9 Reversal through Chicago
- Lifting of export ban introduces more choices for crude selection based on economics

Canadian Economics challenged

- Taxation, abandoned well closures (over 700) and low oil pricing present a challenge to sustain production

Canadian crude becoming more stranded

- Only outlet is through the US via Cushing
- Priced against Maya at a discount
- Less Diluent, thus less of an outlet of LTO light and natural gasoline

Canadian / US Major Crude Pipelines

Canadian & U.S. Crude Oil Pipelines - All Proposals

Enbridge Gateway is delayed for years

Eastern line to Saint John extreme environmental hurdles

Access to Eastern Canadian Refineries via US

Cushing to US GC line in place and being used

USA Oil Flow – Expanding the Options

Storage capacity increasing

- Houston and St. James capacity increasing

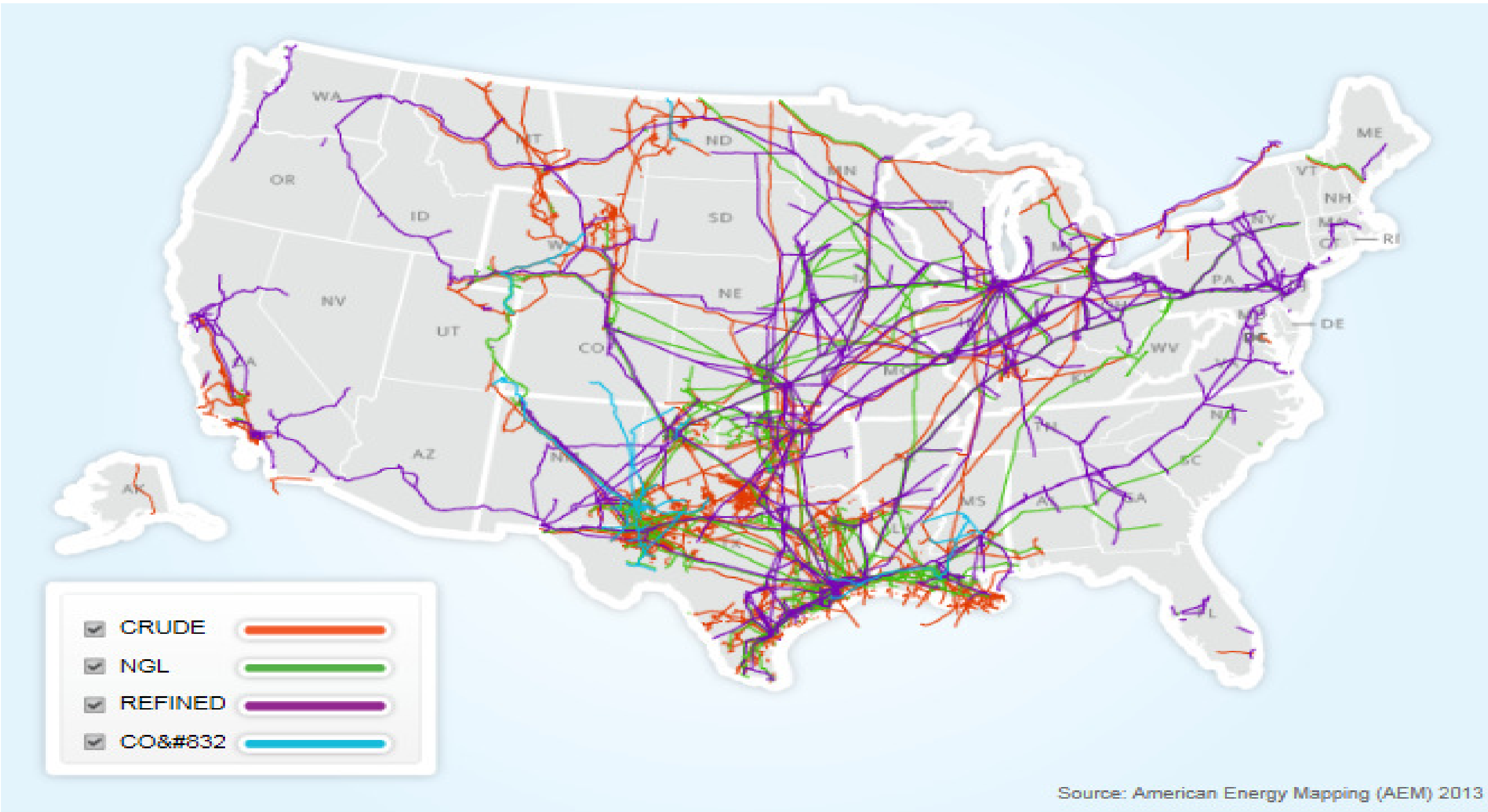
USA pipeline construction continues

- Cushing to Memphis
- West Texas to Houston Reversed Zedyco to St. James
  - LTO from West Texas now via pipeline to Louisiana
- New line Connecting Shell Convent / Norco (and others)
- Line 9 from Chicago to Quebec
- Potential isolation of crude processing in some regions
  – Capline from Gulf to Patoka maybe be reversed to supply Canadian and mid-continent crude to Gulf Coast into Louisiana refineries

US Crude Shifts – PADD Differences

Impediments Continue	• Crude exports open market however… – Jones Act continues to inhibit economic access to crude to PADD I and V. Crude from USGC to East Coast must be delivered in Jones Act Vessel.
PADD Differences	• PADD I – Competitive to foreign refiners – Import of crude and product from Canada, EU and ME • PADD II & IV – Domestic and Canadian Crude mostly, meeting domestic demand • PADD III & V – Blend of Domestic / Foreign – PADD III – Exporting Products Gasoline / Diesel / Jet / Diluent – PADD V – Importing crude and product on the margin

USA – Pipelines



Margin and Demand Driven

Global Boundaries

Regulatory Changes Impact Refining	• Emissions regulations and drive for lower fossil fuel
China	• Changes in Coke Sulfur imports • Lower Coal use / Reduce Emission
US / EU	• Lower Ozone / RVP / NOx / Particulate / Sulfur
HS Fuel Oil Declining to Elimination	• MARPOL – 0.5 wt% Sulfur fuel • Power Plants shifting to Nat Gas

Markets and Demand – It's Margin

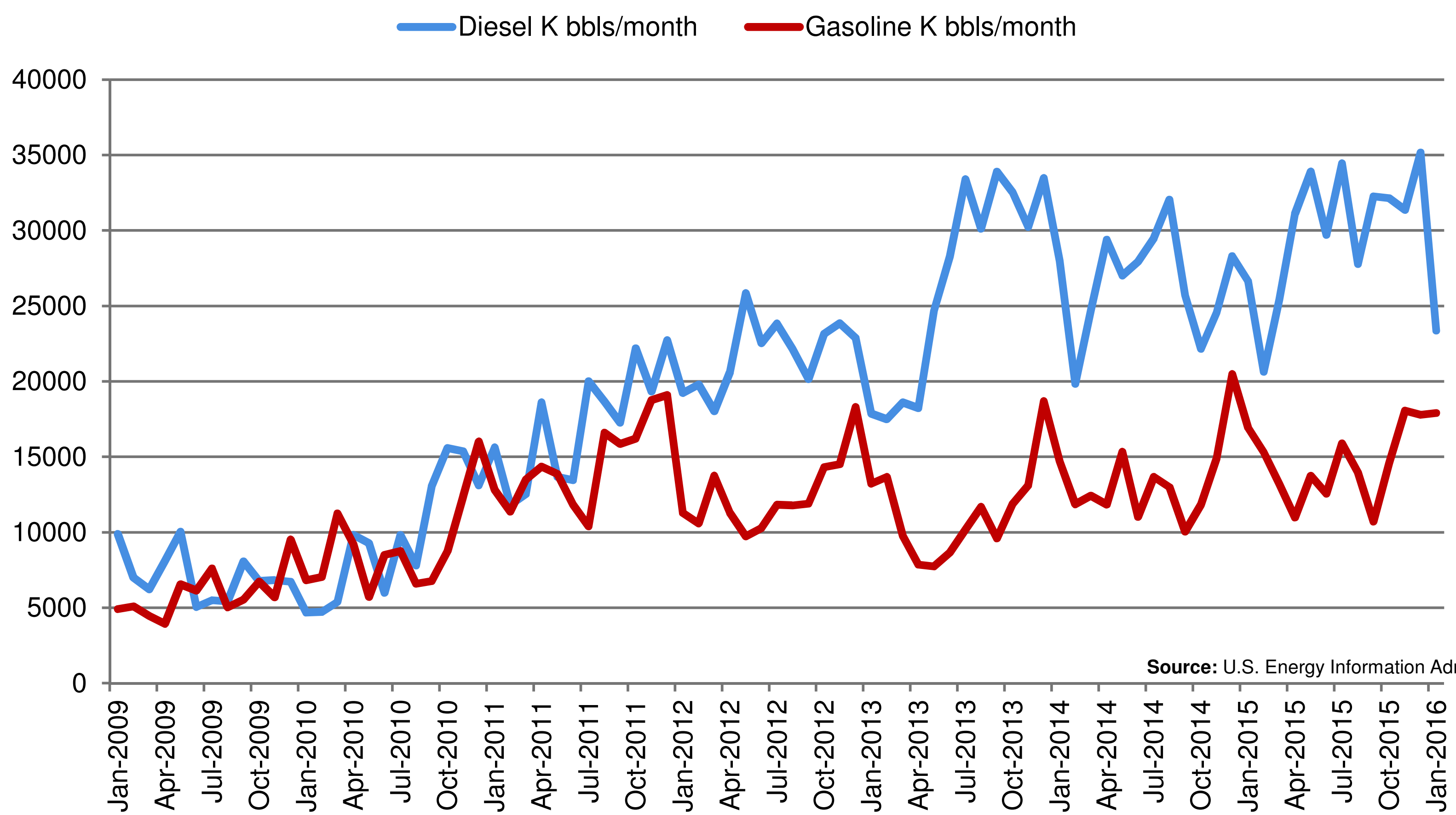
- Export ban lifting opens up each PADD to margin pressures that are different
- Margin
  - Domestic cracked spreads solid to strong (PADD II / IV)
  - Incremental value in crude processing and exporting product (PADD III)
    - PADD I – Most constrained margin
      - The advantage of stranded LTO is gone. Foreign crude competitive thus shrinking margin against foreign supplies at NY Harbor.
      - No meaningful export of production from East Coast

What Happened to Diesel?

Cheap crude changed the dynamics of fuel

- Gasoline demand enjoys growth in EU
  - Thanks to VW and diesel emissions scandal there is continued political drive to cut pollution in London and Paris (political centers) banning diesel vehicles
  - Gasoline demand in US continues to increase
  - Asian demand of gasoline rising (India and China)
- Market glut in diesel
  - Diesel demand down (lower US E&P)
  - New refineries focused on diesel vs. balance production
  - China Teapots switched from fuel oil to crude processing increasing glut

US Export – Diesel / Gasoline



Source: U.S. Energy Information Administration

Production Demand – Looking Forward

EU refineries continue to be challenged with lower margin operations

Middle East and Asian growth to supply EU and Asian demand

- ME investment in refinery projects in Asia to source crude

Latin American demand will continue to grow without refinery expansions

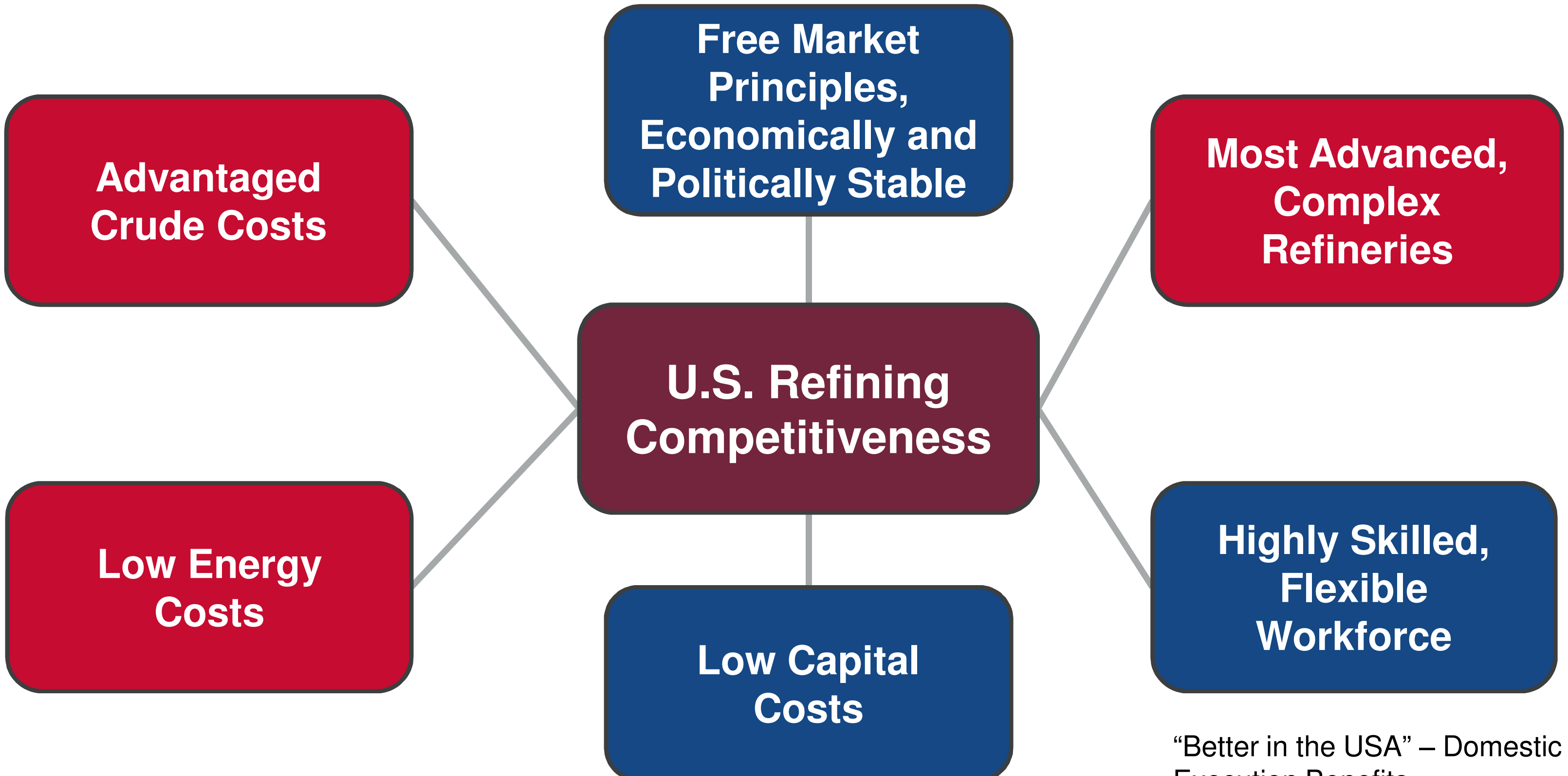
- Home for US produced gasoline and diesel

The US Advantage

Everyone is a Merchant Refiner

The US Wins

U.S. Refining Competitiveness Factors



"Better in the USA" – Domestic Project Cost and Execution Benefits – Turner Mason

US Product Demand

Gasoline demand may increase somewhat, however…	• Advent and improvements in hybrid vehicles will dampen growth • Use of Compressed Natural Gas (CNG) in dual fuel fleets more prevalent
Diesel demand will be steady	• Potential to grow with “resurgence” of LTO
US refiner utilization to remain >88%	• Export market demand will drive USGC refiners with domestic needs supplied by Mid-Continent facilities

Coker / FCC / Sulfur

Coker Operations Incentivize Crude Options

- Coke is < 5% of refinery profit therefore value is in discounted crude
- Petcoke disposal will be the challenge in next 10 yrs

Sulfur – function of crude feed and will export to LATAM markets

FCC – Revitalized

- Gasoline demand domestically and LATAM

The Next Three Years

Crude Oil Price Will Increase

- **After the glut is gone**
  - Lack of exploration and recovered reserves will incentivize LTO recovery
- US / Canadian infrastructure investment now in place to take greater advantage of LTO

Challenges in Excess C4 / C5 Management

- Expect 1 psi RVP waiver to disappear

Questions?

Thank you.