American Fuels

Challenges and Opportunities

American Fuel and Petrochemical Manufacturers

110 Years of Fuels for the American Economy

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Production of American Fuels

• Availability of Feedstocks
• State of the Industry
• Regulatory Risks
• Realizing the Downstream Renaissance
NPC Findings
Future Oil Production

Note: The oil supply bars for 2035 represent the range of potential supply from each of the individual supply sources and types considered in this study. The specific factors that may constrain or enable development and production can be different for each supply type, but include such factors as whether access is enabled, infrastructure is developed, appropriate technology research and development is sustained, an appropriate regulatory framework is in place, and environmental performance is maintained.

Source: Historical data from Energy Information Administration and National Energy Board of Canada.
Projected Imports of LNG vs. Actual
(or why forecasters should be humble)

Source: EIA data and forecasts
Canadian Imports

Source: EIA
Total Canadian Oil Production (NEB Reference Case)

Unconventional Production from Bakken, Niobrara, and Eagle Ford is 10% of U.S. production or roughly 600,000 b/d

Source: EIA and HPDI Data
Near Term Outlook -- Unconventionals

Source: HDPI data, EPRINC estimates
State of the Industry

*A Tale of Two PADDS*
U.S. Cracking Margins

Source: Platts Data
U.S. Refiner Gross Margins on Major Refined Products

Source: EIA data, EPRINC calculations
Refinery Acquisition Cost of Crude

PADD 1 has the highest RAC in the U.S. – and the least heavy crude processing capability.

Source: EIA Data
U.S. Refining Capacity, Utilization

Source: EIA Data
PADD 1: Largest Consumption Decline in U.S.

PADD 1 accounts for approximately ½ of the decline in U.S. petroleum consumption that has occurred during the past 6-7 years.

Source: EIA Data
Net Product Imports by PADD

Source: EIA Data
Refinery Utilization by PADD

Low Utilization in PADD I
PADD I refiners face high feedstock and regulatory costs, declining demand—leading to capacity losses.

Source: EIA Data
Atlantic Basin Refinery Closures

PADD I closures, 2009 – 2012 estimated at over 700,000 b/d

Main causes include:

• Rising federal and state regulatory costs (and uncertainties on future regs)

• High refiner acquisition cost for feedstock

• Limited infrastructure for accessing rising volumes of lower cost domestic feedstock

• Low cost gasoline imports from European refiners as U.S. Gulf Coast refiners face obstacles for moving volumes by ocean tanker
U.S. Refined Product Consumption, Net Imports (now Exports!)

Source: EIA Data
Low Cost NG Lowers Production Costs

Effective Production Cost takes into account a refinery’s ability to use heavy crude feedstocks (complexity), product slate (yields) and operating costs (OPEX).

Source: OGI Data for 2009, EPRINC Calculations
Regulatory Risks
Understanding Legislative and Regulatory Risks

- Tier III gasoline specs
  - Sulfur levels already reduced 70% to 30 ppm in recent years – lower sulfur specs mean more hydrotreating, more CO₂ emissions.
- GHG Tailoring Rule
- LCFS
- New Source Performance Standards
- Unpredictable and uncompetitive tax regimes
- Washington state’s proposed $1.50/bbl fee
- Ethanol and advanced biofuels requirements
- Restrictions on access to low cost feedstocks (e.g., Keystone XL)
Investment by U.S. Refiners in Environmental Controls, $112 billion in environmental improvements, from 1990 to 2008

Source: Wood Mackenzie analysis
In our 2009 study of the Waxman-Markey bill, we estimated that up to 2.5 mm b/d of U.S. capacity would be idled/closed....
EISA ’07 Renewable Fuels Standard

![Graph showing the renewable fuels standard from 2006 to 2022. The categories are Biomass based Diesel, Any Advanced, Cellulosic Advanced, Corn Ethanol / Other, and EPACT 05. The graph shows a steady increase in biomass based Diesel and any advanced fuels, with a slight increase in cellulosic advanced and corn ethanol / other, and EPACT 05 showing a consistent increase.]

Source: DOE
Gasoline Consumption and Ethanol Blending

Source: EIA Data

Source: EIA Data
Ethanol and Gasoline Futures Prices

Source: CME Group data, EPRINC conversion for ethanol
Source: EIA Data, EPRINC Calculations and Assumptions. 2012 and 2013 assume RFS mandates of corn based ethanol (renewable ethanol) only and 8.9 mm b/d of total gasoline demand.
Importance of the Downstream Renaissance
Refining Value to the U.S. Economy

• America’s refining and petrochemical community employs nearly 2 million people directly and indirectly.

• The refining sector employs 108,124 people directly and created 431,115 American jobs through indirect and induced employment.

• Workers in the refining industry earn an average hourly wage nearly 50 percent higher than the national average and have a safety performance five times safer than the average U.S. manufacturing facility.

• 48 percent of refining facilities utilize union labor, the highest of all American manufacturing sectors.
Employment in the American Refining Industry, 2009

Source: PwC Economic Impact & Employment Report 2011; Wood Mackenzie analysis
Refining Labor Income and Value Added by PADD (2009)

Source: PwC Economic Impact & Employment Report 2011; Wood Mackenzie analysis
Refining Capital Expenditures (2004-2010)

Source: Oil & Gas Journal, 2010; Wood Mackenzie analysis
Major Challenges and an Opportunity for U.S. Refining Industry

• Declining demand, especially severe during 2007-2009 economic downturn.

• Low cost imports from growing capacity abroad, gasoline imports remain a by-product in Europe as diesel requirements grow.

• Operable capacity too low, especially difficult for Northeast and West Coast refineries.

• High cost and high risk regulatory environment for plant operations, barriers and infrastructure limitations movement of crude and product.

• But surge in U.S. and Canadian feedstock and low cost refinery fuel offer enormous opportunity for refining and contribution to U.S. economic growth.