

Current Issues in Petroleum Refineries

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Topics re Petroleum Refining

- “What’s that Thing”
 - Basics of Refinery Processes
 - October 2007
- “The Three N’s of Air”
 - Basics re NSPS, NESHAPs and NSR
 - October 2011
- “Current Issues in Petroleum Refining”
 - Current Business and Environmental Issues
 - October 2012

Current Hot Issues

- Business Issues
 - Increase in North American oil and gas production
 - Reduction in gasoline demand; the emergence of diesel
- Environmental Issues
 - NSPS Ja
 - Construction permitting
 - Stricter specs for gasoline

Business Issues

- Increase in North American oil and gas production ¹
 - Proven reserves of U.S. oil and natural gas in 2010 rose by the highest amounts ever recorded since estimating began in 1977 (why is this date relevant?)
 - Canadian fields coming online
 - Reduced demand for crude imports from outside N.A.
 - A few years ago, we were looking at importing liquefied petroleum gas – the balance is shifting towards exports
 - Cost of raw materials is a major impact on cost and profitability
 - But how do we get the crudes to the refineries – Keystone Pipeline?



Business Issues – cont'd

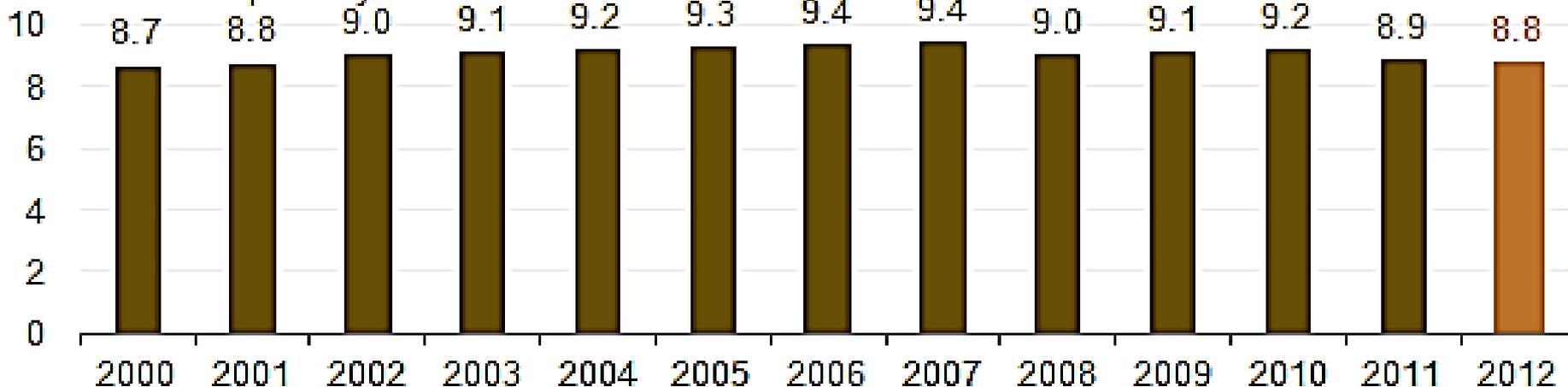
- Some of the reasons for increased production
 - Hydraulic fracturing
 - Shale oil production
 - Enhanced techniques are frequently in the news with viewpoints for and against
 - Stated positions for
 - Have major economic benefits in regions where fields have increased production
 - Less dependence on overseas suppliers that may be in less stable political regimes
 - Stated positions against
 - Concerns about chemicals used in fracturing process
 - Concerns about additional processing required for shale oil extraction
 - Will continue to be discussed as domestic production increases

Business Issues – cont'd

- U.S. Gasoline demand has peaked – why?

U.S. summer gasoline demand, 2000-2012

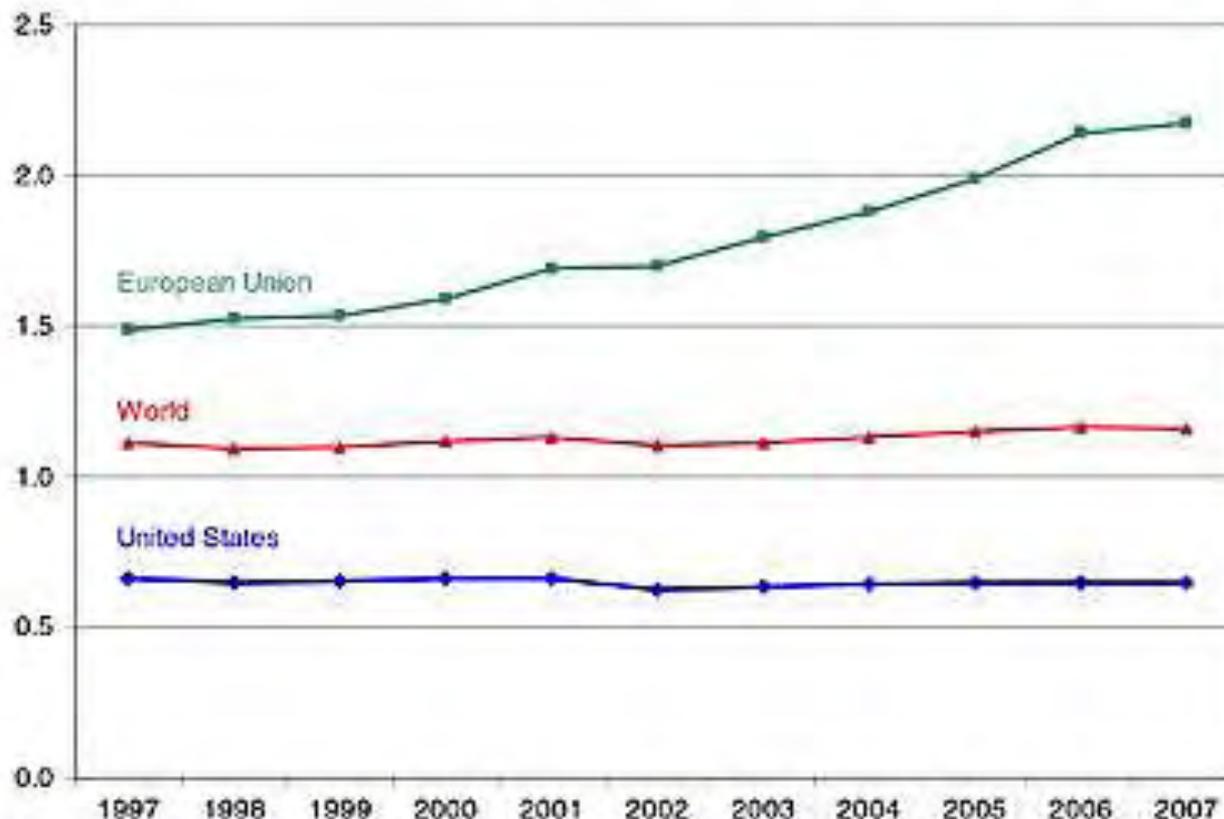
million barrels per day



Business Issues – cont'd

- What is going on in Europe?

Figure 4.2. Ratio of Middle Distillate Consumption to Consumption of Gasoline and Light Naphtha Products by Region, 1997-2007



Source: BP p.l.c., BP Statistical Review of World Energy June 2008 (London, UK, 2008), web site www.bp.com/productlanding.do?categoryId=6929&contentId=7044822.

Environmental Issues

- Not an exhaustive list!
- NSPS Ja
 - Finally Final?
 - Flares
 - Won't most refineries trigger sooner rather than later?
 - Meet H₂S spec for routine flaring
 - CEMS
 - Root cause analysis
 - Proposed flow limit removed
 - Fuel gas combustion devices
 - Need cleaner fuel than the existing NSPS J system – added 365 day H₂S spec to the 3 hour spec in NSPS J
 - NO_x spec added

Environmental Issues – cont'd

- NSPS Ja - continued
 - Catalytic cracking (FCCU) – changed from J
 - Changed affected facility definition – was the regenerator/air blower, now all of the unit including control devices (ex the furnaces regulated separately)
 - Added NOx limit, lower PM limit for new units
 - Sulfur Plants – changed from J
 - Also changed affected facility definition – was claus only, now includes pits and control devices (not secondary sulfur storage tanks)
 - For existing FCCUs and Sulfur Plants – does the new definition help or hurt?
 - Cokers – newly added to NSPS
 - Requires venting coke drum to fuel/flare down to 5 pounds
 - How does a facility trigger?

Environmental Issues – cont'd

- Construction permitting
 - Have you tried to model against the new NAAQS for SO₂, PM or NO_x?
 - May need to identify credits to net out, or accept lower limits for permitted sources to make your project feasible
 - New ozone standard coming
 - Virtually all of the state may be non-attainment
 - Welcome to ozone SIPs and NNSR
 - Start thinking about potential VOC and NO_x reduction steps
 - Greenhouse Gas
 - Per EPA, 50 GHG PSD permits have been issued as of early October, none yet for Petroleum Refineries
 - “Energy efficiency” is BACT – how will that be measured and enforced?

Environmental Issues – cont'd

- Next round of specifications for gasoline
 - Higher ethanol requirement?
 - Lower vapor pressure requirements – when do you put the displaced molecules?
 - Lower sulfur – only the “hard-to-desulfurize” molecules are left – will new equipment be costly
 - Will these changes require construction permits?

Questions or Comments?

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