Gasoline and Diesel prices are controlled by the law of supply and demand. However, they can be affected by:

- Fundamental energy content
- The cost of crude oil
- Refinery configurations
- Industry capacity utilization
Refinery Production Decisions

- Typically based on LP modeling
  - Input mix and characteristics
  - Output product mix and volume
  - Expected costs and realizations
  - Refinery technical limitations

- Technical variables are unique by refinery

- Price, mix and volume of inputs, outputs, are unique by company

- Highly proprietary; competitively sensitive
Historical Refinery Operations

- Historically US refiners would seek to maximize gasoline production relative to diesel in spring and summer and maximize heating/diesel in fall and winter because seasonal changes in demand.

- Refinery upgrades and expansions favored conversion units to make more gasoline.

- At full utilization, the last refinery barrel processed produced more distillate than gasoline.

- Spring and Summer were when refineries became profitable.

- A refiner would seek to maximize light product volume over heavy product production because of better expected sales value.
Most US refineries have the capability to “swing” a limited volume of heavier gasoline components into diesel fuel.

This capability varies by refinery and is believed to be in the 6-8% range.

High refinery utilization may reduce this capability.

The swing decision is based on relative gasoline to diesel economics.
Recent Refining Conditions

- Since the fall of 2004, the market has signaled for refiners to be in maximum distillate operations almost continuously.

- Refinery operations were at very high utilizations throughout the year.
  - Turnarounds and new Environmental units kept utilizations tight in fall and winter.

- Fall and Winter operations were profitable.

- Seasonal effects have become smaller.
  - Heating oil portion of distillate production has been dropping.
Current Refinery Operations

- High crude prices and biofuels mandates have resulted in negative hydrocarbon gasoline demand growth
  - Reducing Refinery capacity utilization year round

- Most new Environmental projects have been completed

- Highway diesel demand has continued to grow reflecting strong worldwide diesel demand

- Residual products, such as asphalt, bunker fuel, etc. have been unable to pass along the increase in crude prices
Refinery Diesel Options
After Maximizing “Swing Stream”

❖ Short term (1-3 years)
  – Improved distillation cuts into diesel component pool
  – Debottleneck existing hydrotreaters
  – Investigate changing Gasoline, Kerosene, Jet and Diesel cut points
  – Change FCCU operations/catalyst

❖ Long term
  – Build hydrocrackers
  – Modify hydrotreaters to handle more difficult feed streams
  – Build units to convert current residual products to diesel fuel.
Other Coming US Diesel Requirements

- **2010**
  - Remaining 20% of US highway diesel goes to ULSD
  - US Off road diesel goes to ULSD
- **2012** – Railroad and Marine diesel goes to ULSD
- **Worldwide Marine fuel changes**
  - 2015 SECA’s require 0.1% sulfur distillate
  - 2020 All bunker fuel could become 0.5% sulfur distillate (ships will compete with trucks)
- **Biofuels mandates (US and worldwide)**
- **Low carbon fuels requirements**
- **Other GHG legislation/regulation**
Future Trends

- Diesel fuel is projected to grow faster than gasoline for the next 20 years.

- Public and Congressional fascination with CAFÉ tightening will continue with limited interest in current diesel fueled vehicles. This may further reduce gasoline demand relative to diesel fuel.

- The US economy will continue to be more dependent on diesel fuel than gasoline. Diesel demand will continue to be more inelastic than gasoline demand.
Conclusions

- Physical and technical constraints will limit the amount of diesel fuel that can be obtained from a barrel of crude oil.
- US Refineries do not yet appear to be physically nor technically constrained in terms of diesel fuel production.
- Incremental diesel production decisions will be influenced by the expected margins derived from the other products that will be produced.