

Heart of the Barrel: The Future for Middle Distillate Fuels

STUDY BACKGROUND

The next 10 years will witness radical shifts in the supply/demand balance for jet, diesel, and other middle distillate products, which will have profound impacts on crude and product pricing and refining margins. On the demand side, the traditional demand for diesel in trucking is increasingly supplemented by a growing share in the light passenger vehicle market in some regions. Growth in distillate bunker fuels will accelerate as new emissions regulations come into effect. Demand for jet fuel is also growing, but with industry-wide drives to cut costs and with new higher-efficiency aircraft, the rate of growth is slowing. In addition to these “base load” demands, there are periodic requirements for distillates as the “fuel of last resort” to generate electric power. At the same time, demand for distillate heating fuels is contracting. In nearly all sectors, sulfur specifications are continuing to tighten. Overall, PIRA expects that global end-user demand for distillate products will grow more slowly over the next 10 years than the last 10, but it will *still* be the fastest growing of the major oil products.

On the supply side of the equation, the story is also changing. A tremendous surge in refinery conversion capacity — much of it diesel-oriented — is being built. This step change is more than what is needed to balance incremental supply with demand growth and will eliminate today's shortage of distillates. However, capacity additions and supply impacts will vary greatly by region. Substantial changes in distillation utilization, conversion utilization, and yield shifts will result. Trading patterns will shift.

These forces will impact product price spreads, crude differentials, and refining margins, reversing some of the trends of the last four years. **PIRA will assess the impact of these forces in an upcoming multi-client study, HEART OF THE BARREL: THE FUTURE FOR MIDDLE DISTILLATE FUELS.**

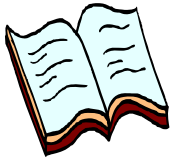
“HEART OF THE BARREL” IN BRIEF

Comprising a report, database and briefing, the study — due for release in January — includes:

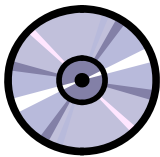
- **An in-depth outlook on the factors driving global/regional middle distillate product usage.** Demand trends by region/country and by end-use sector will be examined to show why growth has been so strong but is now expected to slow in most areas and even decline in some sectors.
- **Analysis of the impact of tightening sulfur specifications.** The continuing rapid shift to lower sulfur will be more challenging as demand for higher sulfur distillates sharply declines.
- **A detailed look at the production of middle distillate products, examining changes in crude slate, refinery runs, and refinery conversion capacity.**
- **Analysis of interregional trade flows for jet/kero and diesel/gasoil and how they will evolve** as supply, demand, and product quality requirements change.
- **Regional price forecasts relative to crude and other products,** product quality differentials, prices relative to competing fuels, arbitrage opportunities, and the factors driving these relationships.
- **Regional Reference Case projections through 2020,** by year, as well as alternative scenarios that test the impact of key variables on those projections.

WHAT STUDY SUBSCRIBERS RECEIVE

Study subscribers receive the following deliverables:



WRITTEN REPORT (Released January 2009) – Clients will receive three (3) copies and on-line access to a report that spells out the findings of the study, the bases underlying those results, and a discussion of key uncertainties that impact the major findings. The report will discuss the Reference Case results by region and will contrast them with alternative scenarios. This roughly 200-page document includes an executive summary, as well as detailed discussion and illustrative charts on: demand, supply, changing quality specs and their environmental drivers, price, trade, and alternative scenarios.



DATABASE (January 2009) – Clients will receive online access to the study database (in MS Excel spreadsheet format). The database will provide annual **historical actuals back through 1995 and forecasts through 2020, including:**

- **Country-level demand by sector for jet/kero and diesel/gasoil, with breakouts by sulfur level and other qualities where applicable.** Covering multiple products, spread across 145 countries and five end-use sectors, and spanning 25 years from history through forecast (1995 to 2020), the database's scope and level of detail will be unmatched compared to other studies.
- **Regional middle distillate supply, with the impact of refinery capacity changes broken out.** Annual refinery unit capacities and distillate production for jet/kero and gasoil/diesel will be reported for each of 13 regions spanning the globe. Crude production by type and total regional refinery runs will be included.
- **Inter-regional jet/kero and diesel/gasoil trade flows.** Net trade between the 13 trading regions will show how demand and refinery production changes lead to evolution in trading patterns.
- **Price forecasts**, both absolute and relative to crude/products, by region and quality for annual averages from 1995 to 2020.



BRIEFING (March 2009) – Clients will have the opportunity to see a presentation of the key results, discuss those findings and their implications, and question the study's authors in a briefing to be held in London after the report and database are released. (The exact timing and location of the briefing will be determined later in 2008. It is possible that an additional or replacement briefing may be held in another city.) The briefing will also be Webcast for those unable to attend in person and recorded for later review via PIRA's Website for study subscribers.

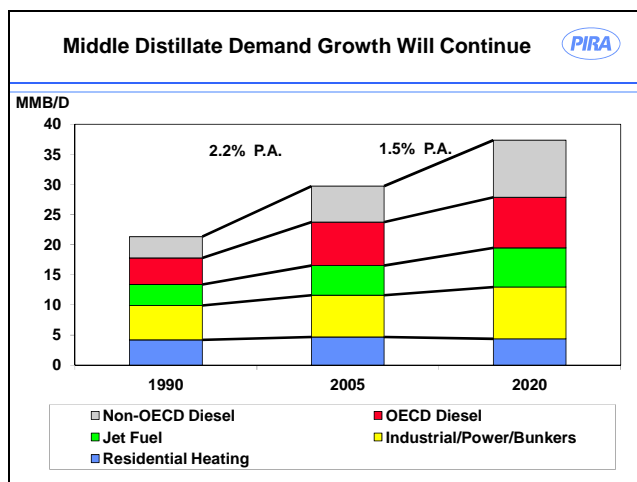
The 13 Regions Covered in the Study

U.S.
 Canada
 Latin America
 Western Europe
 Eastern Europe
 FSU
 Mideast
 Africa
 South Asia
 Southeast Asia
 China
 Japan
 Australia/New Zealand

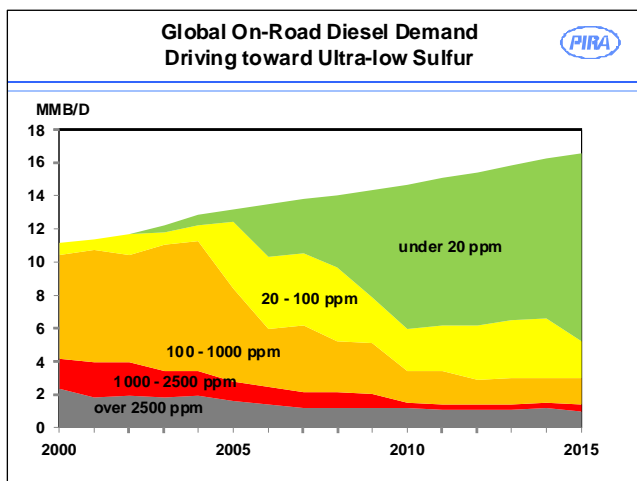
STUDY DETAIL AND METHODOLOGY

A Fresh Look at Demand Trends

The long historical growth in distillate demand is expected to continue, but more slowly. Slower diesel demand growth in the OECD — with diesel penetration into passenger vehicles largely confined to Europe — will be in sharp contrast to rapid demand increases in the developing world. Jet demand growth will slow as cost-cutting deepens and aircraft efficiency improves. The use of kerosene and distillate fuel oil for heating will decline.



Distillate bunker demand, on the other hand, will grow more robustly both as the vessel fleet grows to meet expanding trade and as new emissions regulations come into effect.

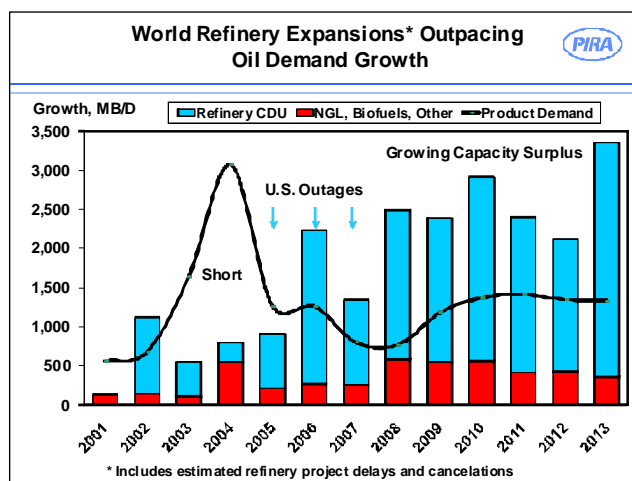


Combining this growth with tightening product sulfur specifications will lead to an explosion in demand for ultra-low sulfur diesel and a near collapse in demand for some of the higher sulfur grades.

HEART OF THE BARREL will examine demand trends for jet and on-road transportation diesel, distillate bunkers, distillates used by industry and for power generation, and kerosene and heating oil used for residential heating. Regional/country forecasts and key demand splits by sulfur level will be included. Factors influencing these trends — including policy, substitution potential, efficiency improvements, and quality requirements — will also be addressed. Demand scenarios that test the impact for a range of possible economic and regulatory factors will provide alternative outcomes around PIRA's Reference Case forecast.

A New Assessment for Distillate Supply

With demand for light products growing more rapidly than that for heavy products, ongoing additions to refinery resid conversion capacity are required to balance light versus heavy supply and demand. In addition, with distillate demand growing the fastest of the light products, an ongoing shift in light product yields toward distillates is also needed.

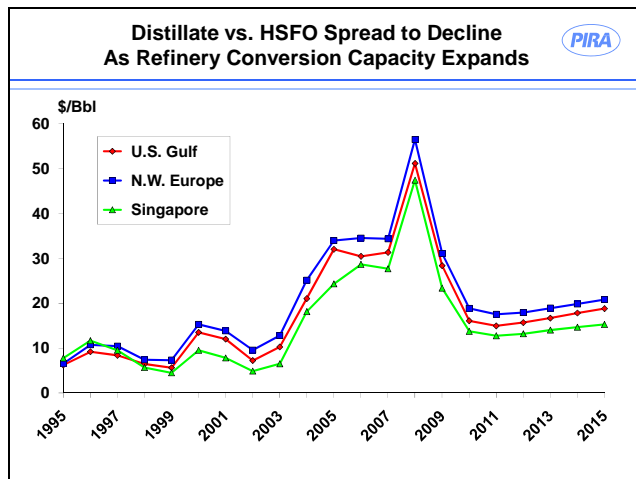


STUDY DETAIL AND METHODOLOGY (CONTINUED)

Over the last few years, capacity additions were limited, forcing distillate prices to record levels relative to other products. However, with increasing yield shifts in existing capacity and a step change expected in new capacity, distillate balances will loosen. Distillate price spreads will ease relative to crude and heavy products. Diesel versus gasoline spreads will ease from the peaks seen in mid-2008, but they are still likely to favor diesel.

Rapidly Changing Price Relationships

With these changes in demand trends and refining capacity will come dramatic changes in pricing relationships. The study will address these impacts. Changes in middle distillate prices relative to other products and crude will be quantified. Quality and regional differences will be described.



These changes in product price spreads will fundamentally affect refinery margins, inter-

regional arbitrage opportunities, and even crude price differentials.

A simple extrapolation of recent trends in aggregate distillate demand, supply, and price will *not* give a reasonable forecast for future trends. Careful examinations of the regional demand trends by end-use and the layers of supply on the margin are needed to assess distillate prices.

HEART OF THE BARREL will show how a detailed and nuanced look at the underlying trends builds up to very different conclusions for the future. This study will use PIRA's proprietary tools to model demand, refining capacity, trade flows and price, allowing the careful build-up of the Reference Case outlook and alternative scenario cases.

The study also answers these important questions:

- 1) To what extent will the global balances for light products in general, and middle distillates in particular, loosen, and what will be the implications for price spreads, refining margins, and crude differentials?
- 2) How are the balances for low-sulfur expected to be different from high-sulfur distillate products?
- 3) How will these trends affect future refinery operations and margins?
- 4) What are the changes in trade patterns and arbitrage relationships that can be expected?

WHO WILL BENEFIT FROM THIS STUDY?

The stakes are high when it comes to making decisions regarding future diesel, jet, and other middle distillate product supply, demand, and pricing. Inevitably, market participants will end up on either side of multi-million-dollar gains or losses. **HEART OF THE BARREL: THE FUTURE FOR MIDDLE DISTILLATE FUELS** will help them keep ahead of the competition through a better understanding of the future interplay between regional distillate balances, regional pricing for different qualities, inter-regional trade, and the impact of these factors on refining margins. The following will all benefit from this study:

- **Crude producers** know the importance of product supply/demand balances that set relative values for products and consequently impact crude-quality price differentials. This study will help them identify and evaluate the future refinery value for heavy versus light, and distillate-rich versus naphtha-rich, crudes and thus the potential value of different heavy crude upgrading processes.
- **Refiners** need to plan capacity changes based on the outlook for product demand and relative crude/product pricing. By providing a firm basis in evaluating future changes in these factors, which define refinery conversion margins, the study will help refiners evaluate the future profitability for different refinery configurations.
- **Trading companies** want to anticipate regional supply/demand changes and price dynamics. This analysis will aid in planning terminal and shipping infrastructure needs to best capture trading opportunities.
- **Shipping companies** know that their single largest expense is for bunker fuel, and they face uncertainty both on its price and regulations on sulfur content. **HEART OF THE BARREL** will provide a distillate fuel oil bunker price basis under different demand/regulatory scenarios.
- **Policy makers** need timely insight into how proposed changes in product quality regulations will affect supply, demand, price, and industry profitability. This study will enable them to better evaluate the impact of future regulatory changes.
- **Airlines, diesel consumers, and other end-users** constantly consider how changing price dynamics will influence service choices and future capacity decisions. The study will make these end-users better equipped to adapt to supply and price shifts, and it will help new project developers make more effective evaluations of fuel supply options and project viability.
- **Manufacturing companies** need a sound understanding of jet/diesel/heating oil pricing in order to develop products (aircraft, autos, etc.) that will best meet future market demand.
- **Financial institutions** must make sound evaluations of how changing market conditions will affect the economics and financing of new refining, oil infrastructure, and marketing ventures. This study will allow for more informed decision-making on potential projects.

FEES AND OPTIONS

HEART OF THE BARREL: THE FUTURE FOR MIDDLE DISTILLATE FUELS can be purchased by both PIRA retainer clients as well as non-clients. **Existing PIRA retainer clients receive a reduced price.** For detailed service pricing options, see the Acceptance Form on page 8.

ABOUT PIRA ENERGY GROUP

The PIRA Energy Group, founded in 1976, is an international energy consulting firm, offering Retainer Client Services as well as customized consulting on a broad range of subjects in international oil, natural gas (and LNG), coal, electricity, biofuels, freight markets, and related environmental issues. PIRA provides evaluation of key U.S. and international energy issues that impact the behavior and performance of the industry and its various markets and sectors. Currently, more than 550 companies spread across some 60 countries worldwide retain PIRA, including international and national integrated oil and gas companies, independent producers, refiners, marketers, oil and gas pipelines, electric and gas utilities, industrials, trading companies, financial institutions, and government agencies.

KEY MEMBERS OF PIRA'S MIDDLE DISTILLATE STUDY TEAM

Richard Joswick (Study Leader; Managing Director, Global Oil Group) develops PIRA's outlook for crude and products pricing, refinery margins, and inter-regional supply balances. He authors PIRA's monthly European Oil Market Forecast and numerous special projects. Last year he was the study leader for the multi-client study: *Bottom of the Barrel: The Future for Residual Fuel Oil*. He joined PIRA in 2004 after 20 years with ExxonMobil in supply logistics, planning, refining, and engineering. During his time at ExxonMobil, he had assignments developing near-term oil market forecasts, designing heavy oil upgrading processes and evaluating refining economics. Rick has M.S. and B.S. degrees from Rutgers University in chemical engineering.

Dr. Mark Schwartz (President) works closely with PIRA's Global Oil and Natural Gas groups to evaluate the key assumptions underlying their outlooks and to develop plausible alternative assumptions and outcomes. Before joining PIRA in 2002, he was the Chief Economist of ExxonMobil Corp., where he was responsible for developing the company's long-range economic and energy outlook. During his 25 years at Exxon he also had assignments in Upstream Planning, Treasurers, and Corporate Planning functions. Mark holds a Ph.D. in economics from the University of Pennsylvania.

F.W.A. (Bill) Fuller (Sr. Director, International Oil) had over 30 years of energy forecasting and analytical experience with Exxon International before joining PIRA in 1997. He now oversees PIRA's analysis and forecasting of near-term industry oil balances, with particular emphasis on international supplies, and monitors events impacting PIRA's oil market view. Bill has a B.S. in chemical engineering from Cornell University.

Gary Greenstein (Director, Global Oil Group) joined PIRA following 38-year career with ExxonMobil, where he was involved in all aspects of the refining business, including planning, operations, engineering, and research. Gary has a B.Ch.E. from City College of New York, an M.S. in chemical engineering from New Jersey Institute of Technology, and an M.B.A. from Fairleigh Dickinson University.

Peter Jaquette (Director, Global Oil Group) is a key contributor to PIRA's Scenario Planning Service, and was the coordinator for PIRA's *Planning for Tomorrow* study. He joined PIRA in 2007 with more than 25 years of experience in corporate strategic planning and economic consulting, including 14 years with ARCO and nine years with Weyerhaeuser, where he was involved in evaluating cellulosic ethanol and other energy projects. Peter has a B.A. in economics from Swarthmore College and an M.A. in economics from Stanford University.

David A. Zinamon (Managing Director, Refining and Environmental Affairs) specializes in refined products, refinery operations, NGLs, alternative fuels and environmental matters, particularly as they affect petroleum product markets. Among other activities he is responsible for PIRA's World Refinery Database. Dave also authors PIRA's monthly NGL market report. Dave joined PIRA in 1984 after seven years of international energy consulting experience with Chem Systems. This followed several years of manufacturing, marketing and planning positions with Celanese Chemical, GAF Corp., and Airco. Dave has a B.Ch.E. from City College of New York and an M.B.A. from Rutgers University.

Kenneth M. Bogden (Director, Freight Markets) is responsible for PIRA's monthly Freight Market Outlook. Prior to joining PIRA in 2005, Ken worked for ExxonMobil for 27 years, primarily in its oil supply and trading and planning functions. He also served as Coordinator of Transportation Planning for Exxon International. Ken has a B.S. in chemical engineering from Lafayette College and an M.B.A. from Columbia University.

Joseph T. (Joe) Pezzino (Director) maintains PIRA's Worldwide Refinery Database, including capacity analysis, product quality implications, and margins. Before joining PIRA in 2000, he led refinery process tech services, economics, and planning during a 30-year career at Mobil. He also worked in Corporate Supply & Distribution and subsequently at Mobil Research specializing in supply chain optimization. Joe has an M.B.A. and B.S. in chemical engineering from S.U.N.Y. at Buffalo.

Dr. Naing Oo (Associate Director) joined PIRA's Global Oil Group in 1995. He focuses on quantitative and econometric analysis for forecasting oil demand and prices. He is also involved in analysis on crude and product balances and trade flows. Naing holds a Ph.D. in economics from the City University of New York.

Su Hyung Ryu (Associate Director) focuses on crude and product price forecasts. Ms. Ryu maintains and develops integrated oil demand and pricing models and information systems. Since joining PIRA in 1998, she has participated in numerous benchmarking and competitive analysis projects, crude and product marketing assessments, and asset valuations. Prior to joining PIRA, Su worked at Citibank Global Banking, where she analyzed and developed investment database applications. She holds M.S. in business computer information systems from Baruch College in New York.

ACCEPTANCE FORM

(Company Name) _____ wishes to subscribe to the multi-client study **THE HEART OF THE BARREL: THE FUTURE FOR MIDDLE DISTILLATE FUELS**.

We understand and agree that the fees are as follows:

| | PIRA Client, 3 Users | PIRA Client, Add'l Users | Non-Client, 3 Users | Non-Client, Add'l Users |
|----------------------|-------------------------|-----------------------------|------------------------|----------------------------|
| Standard Fee* | \$21,500 | \$1,000 each | \$25,000 | \$1,250 each |

* New York City-based companies, please add 8.625% sales tax; Long Island-based * New York City-based companies, please add 8.875% sales tax; Long Island-based companies, please add 8.625% sales tax; all other New York State companies, please add the county-appropriate sales tax.

Name/Title: _____

Company: _____

Address: _____

Phone/Fax/e-mail: _____

Total Fee: _____

Signature: _____

**PLEASE MAIL OR FAX TO: PIRA Energy Group
Attn.: Managing Director, Client Services
3 Park Avenue, 26th Floor
New York, NY 10016-5989
Phone: 1-212-686-6808; Fax: 1-212-686-6628; sales@pira.com**

Note: A briefing will be given, but its London location may be replaced or added to depending in part on the collective responses from study subscribers and PIRA's other commitments, and it will be announced by year-end. The briefing will also be Webcast live and recorded for delivery on the PIRA website for those unable to attend in person.

Note: *Heart of the Barrel: The Future for Middle Distillate Fuels* will contain no confidential technical information, to the best knowledge of PIRA. However, except for information that is or becomes available to the public in printed publication, or is already in the possession of subscriber or developed independently by subscriber, or is received by subscriber in good faith from a third party, any information in the study is for the sole and confidential use of the subscriber. Subscribers agree to use reasonable efforts to protect the confidential nature of the information supplied to them as part of this study.