

Improving refinery profit margins

21 – 23
March 2011

London
gtforum.com/refineryprofit



Key topics:

- Economic environment and demand prospects
- Refined product specifications
- Crude oil quality and assay interpretation
- Process unit technology and economics
- Product blending techniques
- Refinery planning processes
- Utilisation of linear programming
- Price hedging techniques
- Refinery investment economics
- Energy and other cost factors



Introduction and learning objectives

The 'Improving refinery profit margins' course focuses upon the manner in which refinery profit margins may be maximised.

It is intended to assist analysts, engineers and marketers to understand the inter-relationships between the numerous factors which may be manipulated to maximise refinery profitability given the economic constraints acting upon the refinery and the physical constraints of the refinery facilities themselves. To this end an examination of crude oil and refined product quality is essential, together with the more important refinery processes.

Particular attention is given to intermediate product blending constraints and blending methodologies, including an introduction to the utility of linear programming as a product blending tool and refinery scheduling/planning technique. Crude oil and product price hedging techniques are also examined.

The objective of the course is to provide to individuals directly employed in or associated with refinery operations a better understanding of all the controllable elements influencing refinery profitability.

Who should attend?

The course will be useful for refinery engineers, supply personnel and planning personnel wishing to improve their limited knowledge of the operations and economics influencing refinery investment and refinery profitability. It will similarly be useful to investment analysts and financial personnel interested in the performance of the downstream sectors of oil companies.

National oil company personnel wishing to improve their knowledge of this sector in the international context will also find the course useful. Engineering and construction contracting personnel will also benefit from the course.

Course description

The content of the 'Improving refinery profit margins' course is as follows:

Economic environment

The objective of this section of the course is to describe the relationships between energy (and oil) demand and economic growth in both developed and developing countries, in the context of providing new refinery capacity and expanding existing refinery capacity. Overall refinery profitability trends will be examined together with the issue of capacity utilisation. In addition, the importance of refined product specifications will be discussed and the effect of environmental legislation on specifications will be examined.

Crude oil

This section is designed to illustrate the diversity of crude oil quality internationally in terms of classification methods and product yield. An explanation of the crude oil assay test procedure and the results obtained from assay testing will be provided. More importantly, course attendees will learn how to transform the laboratory assay into the refinery yield obtained from a commercial atmospheric and vacuum distillation unit. The qualities of the various assay fractions will be examined and examples provided of how to blend fractions to achieve refined product key specifications. The qualities of the fractions will also be examined in the context of their suitability for further processing (e.g. hydrotreating, catalytic reforming, catalytic cracking, hydrocracking, and coking).

Crude oil evaluation

Here the effect of different refinery configurations on profitability will be examined in the context of determining the value of a particular crude oil with reference to the price of an international marker grade. Factors considered will include crude oil quality characteristics, refined product prices, geographical location and shipping and pipeline transportation costs. This methodology provides the basis for the initial selection of potential crude oils as refinery feedstocks in different types of refineries.

Refinery processes

The intention here is to describe the configuration and purpose of these process units, together with their key operating parameters. The effect of variation of these operating parameters on process unit product yields and on the economics of operation will be examined. This will provide the basis for the initial selection of process units within a refinery and enable a view to be taken of the optimum mode of operation for each of the units. The information obtained will also provide a basis for the valuation of individual process streams.

Product blending

Here the complexities of blending gasolines, distillates and fuel oils will be examined and delegates will be required to perform theoretical blend calculations in order to maximise blending profitability (minimise blending costs in the context of the values of the blend components). An introduction to the use of linear programming

(LP) will be given in order to illustrate how LP may be utilised to maximise blending profitability. Inventory control will also be examined as a potential input to the LP blending procedure.

Energy and other cost factors

This section of the course will examine the other key factors which influence refinery profitability, operationally and, from an investment perspective, strategically. The potential range in the size of refineries will be discussed and the advantages of larger and smaller refineries will be examined.

Price hedging

The objective here is to explain how the derivatives markets may be utilised to protect refinery profitability. The relationships between physical and futures oil prices will be explained and advice given on hedging the price of a crude oil purchase against potential fluctuations in physical prices. Similarly, advice will be given on hedging the price of refined product sales against potential fluctuations in physical prices. These techniques will be developed to show how refinery margins may be protected. Utilisation of the more complex derivatives will also be examined and their advantages and disadvantages discussed.

Scheduling and planning

The intention of this section is to apply in a hands-on fashion the information and techniques provided within the course to solving typical refinery scheduling, planning and investment problems.



Course programme

Monday 21 March

Introduction and objectives

Economic environment

- Economic growth and energy demand
- Historical oil demand and projections
- Regional product demand influences
- Historical refining margins
- Key product specifications trends
- Pricing trends

Crude oil

- Classification methods
- Assay techniques
- Assay interpretation

Crude oil evaluation

- Refinery configurations
- Crude oil valuation (gross product worth)
- Transportation issues
- Crude oil valuation exercise

Tuesday 22 March

Refinery processes

- Atmospheric and vacuum distillation – technology, modes of operation, economics
- Catalytic reforming – technology, octane vs yield, by-product value, economics
- Catalytic cracking – yields, gasoline vs distillate, economics
- Hydrocracking – yields, modes of operation, economics
- Coking – yields, economics
- Isomerisation, alkylation, bitumen, lube oils, sulphur

Product blending

- Gasoline – specifications, critical qualities, blending techniques and costs
- Gasoline blending exercise
- Fuel oil – specifications, critical qualities, blending techniques and costs
- Fuel oil blending exercise
- Middle distillate blending – specifications, critical qualities, blending techniques and costs
- Middle distillate blending exercise
- Inventory control
- Stream valuation
- Introduction to linear programming

Energy and other cost factors

- Energy efficiency
- Economies of scale
- Other costs

Wednesday 23 March

Price hedging

- Oil futures
- Crack spreads
- Options
- Swaps
- Contracts for differences (CFDs)
- Price hedging exercise

Scheduling and planning

- Long/short range planning
- Strategic planning
- Price/demand forecasting
- Operations planning
- Make-or-buy decisions
- Inventory control and seasonality
- Target setting – throughput, yield, product giveaway
- Investment analysis
- Refinery investment exercise
- Refinery scheduling exercise



Training course fee (per delegate)

For bookings received before 18 February 2011 Course Fee = **£1999 +VAT***. A late booking supplement of £300 +VAT* will be applied to all bookings received after 18 February 2011. *VAT to be charged at 17.5% until the 3 January 2011, after this date VAT charged will increase to 20%

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2011 Course listings

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March 2011, London
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March 2011, London
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April 2011, London
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Training
Meetings of minds

Course presenter

Peter Jones graduated in Chemical Engineering in 1970 and joined Mobil at their Coryton refinery where he undertook assignments in process engineering, computer control, scheduling and economics, supply operations and process unit operations supervision.

In 1977 he joined Esso at their Milford haven refinery where he was appointed Refinery Onsites Operations Supervisor. In 1979 he transferred to the trading subsidiary of the British National Oil Corporation (BNOC) and was appointed Head of Technical and Planning. Here he was responsible for the evaluation of the North Sea crude oils traded by the Corporation together with long-term planning.

Peter joined Gaffney, Cline & Associates (GCA) in 1985 as Downstream Manager, expanding significantly and internationally the company's downstream consulting practice prior to being appointed Projects Director.

In 2000 he started his own consulting company, Synergy Consulting Services Limited, and continues to assist companies involved in the international petroleum industry. Peter has been engaged on projects in more than 50 countries and is a member of the Academy of Experts and the Chartered Institute of Arbitrators.





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Training
 Meetings of minds

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