

CHEMICAL AND ENERGY TRAINING

## “Fundamentals of Refining Economics”

2-day in-depth training course

### Master Refining Economics Fundamentals... Make Better Business Decisions

This course provides basic information and insights into the Refining Economics Industry. The course covers the industry fundamentals, crude oils, refined products, refinery margin calculations and technology, refining configurations and complexity, refining operations and values, trade and transport, and industry trends.

In addition to covering the basics, the course will discuss the constantly changing Petroleum dynamics around the globe, and how that alters the value of the entire supply chain.

It is important to understand these basic industry drivers and how they affect your business, so you can make better, more informed business decisions.

**CPE credits available. For more information, visit: [ihsmarkit.com/chemical-energy-edu](https://www.ihsmarkit.com/chemical-energy-edu)**

### Who should take this course?

The 2-day course is designed for both technical and non-technical professionals, those new to the industry, and those who would like a refresher course. Attendees represent a wide range of job functions and company types.

#### Job function

- Strategic Planning
- Business Development
- Marketing
- Sales
- Finance
- Business/Product Management
- Investment Bankers
- Economists
- Upstream Data Managers
- Project Developers
- Refinery Engineers
- Traders

#### Company types

- Integrated Oil & Gas Companies
- E&P Companies
- Refining & Marketing Companies
- Banks & Financial Organizations
- Chemical Companies
- EPC Companies
- Governments and Institutions
- Commodity Traders
- Storage & Transportation Companies
- National Oil Companies
- E&C Companies
- Industry Suppliers/Licensors

### 2017 Course Schedule:

Houston	June 14 – 15
Singapore	Sept 27 – 28



Register today at: [ihsmarkit.com/chemical-energy-edu](https://www.ihsmarkit.com/chemical-energy-edu)

## About the Instructors



### Glenn Giacobbe; Director, Consulting, IHS Markit

Mr. Giacobbe, based in Houston, Texas, Glenn is a Director of Consulting in IHS Markit Oil Markets, Midstream, Downstream, & Chemicals (OMDC) group. Prior to that, he headed up the IHS Downstream Capital Costs Service. Glenn started his career with IHS in 2010 as an analyst in Chemicals and has an extensive career in the downstream oil and chemicals industry.

Prior to joining IHS Markit in 2010, Glenn worked for Atlantic Richfield Co., BP America, LyondellBasell, Western Refining, and SRI Consulting in various roles including business management, crude oil and products trading, market analysis and refinery technical support.

Glenn has a BS in Chemical Engineering from Carnegie Mellon University in Pittsburgh, PA and an MBA from Drexel University in Philadelphia.



### Fellipe Balieiro; Senior Consultant, Consulting, IHS Markit

Mr. Balieiro is responsible for assisting and developing petroleum price and refining margin forecasts as well as providing consulting services for both petroleum and alternative fuel clients, national and foreign (Spanish and Portuguese speaking).

Before joining IHS Markit, Mr. Balieiro worked for ExxonMobil. While at ExxonMobil, Fellipe held assignments in process engineering, environmental release reporting compliance and engineering asset support.

Mr. Balieiro holds a Bachelor of Science degree in Chemical Engineering from the University of Maryland Baltimore County and a Master of Business Administration from the University of Houston.



### Larry Tan; Managing Director, Chemical Consulting, Asia, IHS Markit

Mr. Tan has more than three decades of experience within the oil and petrochemical industry, specifically in the refinery and basic petrochemical segments within Asia and in the Middle East. He is frequently invited to share his market views at petrochemical industry conferences as well as to conduct bespoke in-house training for oil and petrochemical industry subjects. Mr. Tan also serves as an adjunct lecturer with the Singapore Management University's International Trading Institute.

In addition to prior work as a consultant, the majority of Mr. Tan's career was spent with ExxonMobil Oil and Chemicals in various functional areas of increasing responsibility - process engineering, technical, refinery operations, U.S. research & development, supply chain, shipping, manufacturing planning, joint venture commercial oversight (aromatics) and sales & marketing (aromatics and olefins). After he left ExxonMobil, he traded olefins and aromatics for European firms covering the Asian markets and was the CEO of an Australian biodiesel company based in Singapore.



### Deven Krishnan; Senior Consultant (Asia), Oil, Midstream, Downstream & Chemicals, IHS Markit

Mr. Krishnan is a Senior Consultant in the Oil, Midstream, Downstream and Chemicals team in Asia. He has more than 12 years of experience in the petroleum refining and palm oil industries. His consulting project experience includes market entry studies, refinery modeling, refinery competitive analysis and economic modeling.

Prior to joining IHS Markit, he was attached with Phillips 66 in Malaysia for about 8 years and worked in refinery technical, operations, economics and planning. He was then seconded to Malaysia Refining Company (JV between Petronas and Phillips 66) in Melaka, Malaysia for about 5 years. He began his career as a process engineer with Palm Oleo.

# Day 1

## Introduction to Refining

- Making gasoline and diesel fuel out of crude oil. It's as simple as 1-2-3! (Not really)
- Oil refineries are complex, energy intensive manufacturing processes that run 365/24/7

## Crude Oils

There are thousands of crude oils pulled out of the ground from all over the world and no two are alike. Crude oil is a mixture of thousands of different hydrocarbons that are separated into “fractions” and grouped into Light, Medium, and Heavy products categories with varying levels of contaminants such as sulfur and metals

- **Grades of crude oil** – like refinery products, crudes are lumped into broad categories of light, medium, or heavy, and sweet or sour dependent on the amount of sulfur and other contaminants
- **Quality determines its value** – light sweet crudes can be worth 20% to 25% more than heavy sour crudes (sweet and sour refer to the amount of sulfur in the crude)
- **Crude oil is transported all over the world by land and by sea** – from pipelines, trucks, and rail cars to very large ocean going vessels that hold up to two million barrels

## Refined Products

- Light products (gasoline, jet fuel, diesel fuel) – these are the most valuable products
- Medium products are typically unfinished intermediates that are sold to another refiner, upgraded to light products, or blended with heavy products
- Heavy products (fuel oil, asphalt) – the least valuable products “bottom of the barrel”
- Specialty products (lubricants, solvents, wax) – high value but low volume
- By-products (propane, butane, sulfur, petroleum coke) – medium value and medium volume

## Refinery Margin Calculations

The difference between that value of all the product and the value of all the costs

- Variable Margin = sum of all the product values – cost of crude oil (and other raw materials) – variable operating costs (such as energy, catalysts, and chemicals)
- Net Margin = Variable Margin – fixed operating costs (personnel, other overhead, equipment depreciation, taxes and insurance)

*Class Exercise: Refinery Margins – Calculating gross, variable and net margins for Refinery A versus Refinery B*

## Refinery Technology

Refineries vary widely in complexity depending on the technology employed and number and type of downstream conversion processing units they have. This course will delve into the different types of conversion processes, what they do are how they add value

*Class Exercise: Refinery Optimization – Choosing crude slate and product slate*

## Day 2

### Refining Configurations and “Complexity”

Complexity designation from least complex to most complex

- Topping refineries – do nothing more than separate crude oil into raw, unfinished products (no downstream conversion units)
- Hydro-skimming refineries – ability to make finished light products (gasoline, jet fuel, and diesel fuel)
- Cracking refineries – make additional light products by cracking Unfinished Gas Oils
- Coking refineries – most complex configuration, make almost no heavy products

*Class Exercise: Calculating Refinery Complexity*

### Market Setting Configurations

The market setting configuration is the usually the least complex and marginally profitable refinery in its particular geographic market. Marginal refineries will typically be near break-even economics; sufficient to stay in business but not highly profitable

### Refining Operations

Refers to the day to day operation of the refinery and the resources needed to keep it running safely, efficiently, and at peak economic performance. People are the most important resource in a refinery. They are highly skilled personnel consisting not only of operators and mechanics, but schedulers, planners, and accountants who are responsible for purchasing the raw materials, selling the products, maintaining proper inventory levels, and keeping a safe, clean environment for everyone

*Class Exercise: Gasoline Blending Competition*

### Refinery Values

- What does it cost to build a refinery?
- What is the Return on Capital? How is ROC measured?
- What does it cost to operate and maintain a refinery?
- How does its value change over time?
- Examples of Cash Flow Analysis will be provided

*Class Exercise: Investment Decision Criteria*

### Trade and Transport

Crude oil and refined products are transported by a variety of means including truck, rail, pipeline, barge, and ocean going vessels depending on the size of the cargo and whether on land or by sea. This course will delve into the two most common forms of transportation; pipeline and marine vessels. Other topics will be covered:

- Storage of crude and products in terminals which is a big part of the transport segment
- Trade of crude oil products will be examined. This can also be thought of as imports and exports among countries

### Industry Trends

Petroleum dynamics are constantly changing around the globe which alters the value of the entire supply chain. The following topics are key to those changes

- Did you know that the demand for petroleum products is already in decline in the US and Europe, and that future increase in the demand will come entirely from the developing world?
- How efficiency gains in the transportation sector (automobiles and trucks) impact demand
- How the use of renewable fuels is growing around the world and its impact on oil demand
- How changes in regulations affect demand and refinery configuration