
S&P Global

Commodity Insights



Industry Fundamentals Training

Course Catalogue 2024

S&P Global Training

Over 20 years of experience delivering Learning & Development Solutions to the Industry

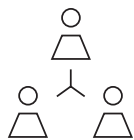
Backed by S&P Global's world-class data and insights, our training courses are developed by international experts, whose extensive knowledge and experience enable them to deliver optimal results regardless of scale, location or learning & development needs.

With an enviable record, S&P Global Learning offers cost-effective training solutions.



Expertise

Specialist knowledge of current training and development industry insights, understanding client needs and delivering the relevant professional skill sets.



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Delivered through our robust and scalable, Training & Development professional resourcing process, ensuring you receive the same high-quality standard.



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Global availability ensuring you have one point of contact to provide high caliber instructors for your worldwide training & development requirement.



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Cost-effective solutions using our contingent resourcing model or our specialist offshore capabilities with full vetting, validation and quality control standards applied to both.

20 Years of Satisfied Learners

“Very informative, broken down into easy-to-understand concepts; weaving stories into dense material is excellent. In retrospect, I would have enjoyed the 3-day course.”

– **Director, Corporate Development, Major Chemical Producer | Understanding the Global Petrochemical Industry**

“Good overview of biofuel markets. The course gave me more understanding of economic drivers for producers, especially credits and the volume targets that drive incentives.”

– **Director of Manufacturing | Bio-Feedstocks**

“The way the course tied various topics together was excellent. From refinery and petrochemical technology, and refinery optimization to GHG reduction initiatives, transportation industry response by sector, and OTC.”

– **President, Major Chemical Producer | Refineries of the Future**

“The commercial strategies sessions were excellent”

– **Global Advisor from an energy major | Oil Markets, Price Forecasting and Commercial Strategies**

“Good, high-level summary of industry developments. The course instructors were very knowledgeable, and well prepared.”

– **Head of Basic Materials at European Banking Institution | Advances in Chemicals Sustainability**

“Very informative, broken down into easy-to-understand concepts; weaving stories into dense material is excellent. In retrospect, I would have enjoyed the 3-day course.”

– **Director, Corporate Development, Major Chemical Producer | Understanding the Global Petrochemical Industry**

Our clients include most major energy and chemical companies



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Biographies of Selected S&P Global Energy & Chemical Experts

Oil Market Fundamentals, Price Forecasting & Commercial Strategies

Lead Instructor: Jim Burkhard, VP, Head of Research, Oil Markets, Energy & Mobility

Oil market experts teach this course, delivering a concise overview of the oil market, supply and demand, and energy transition to understand how the future may unfold. Further, the Commercial Strategies section delivers a comprehensive view of risk management concepts and introduces various commercial tools to mitigate market risks.

Course Outline

1. Oil Market Fundamentals

- Global energy fundamentals: global energy supply & demand
- Structure of the world oil industry
- World oil market fundamentals (part 1): Oil market history; oil demand and supply; forces shaping future of world oil demand; history of oil supply regulation; US Shale; Emergence of OPEC+
- World oil market fundamentals (part 2): oil price history; factors shaping the oil price today; role of futures markets; price benchmarks
- Oil and the energy transition: How to think about the future

2. Market Outlook

- How to develop an oil price outlook, short and long term
- Value of scenario framework for forecasting
- Oil market outlook to 2024 and through 2050

3. Biofuels and Sustainable Aviation Fuel

4. Oil Price Discovery & Trading

- Oil pricing: How does the Brent Market work? Understanding what the physical trading data represents; Methodology: How do we arrive to the price?
- The mechanics of trading physical crude
- Oil price forecast

5. Benchmarks

- Overview of Platts assessment methodology: crude and refined products
- Update on Platts Benchmarks: Dated Brent

6. Carbon Capture Technologies & Trends

7. Emission Intensities

- Emissions, Carbon & Methane intensities
- Carbon price premium

8. Risk Management Concepts

- Approaches to risk management
- Risks with discretionary positioning; Long and short;
- Basis and outright risk; Physical v. Financial exposure

9. Basic Futures

- Futures: ecosystem and settlement
- Margins, basis and spreads

10. Overview of Options

- Basics and definitions
- Variables to determine option prices
- Profit and Loss diagrams
- Basic option strategies

11. Introduction to Basis Trading

- Implications of basis
- Models for basis analysis

12. Introduction to Hedging

- Hedging strategies in trading
- Basic hedging instruments

Refining Economics & The Refinery of the Future

Lead Instructor: Daniel Evans, VP, Global Head of Fuels and Refining Research

Gain an understanding of the fundamentals of refining operations and refining economics, how the industry adapts to a volatile near-term market, and the longer-term pressures of the energy transition.

Course Outline

1. Fundamentals of Refining

- Session 1: Refinery technical configuration and operations
- Session 2: Refinery economics and margin optimization

2. Energy Transition

- Session 1: Fundamentals
 - What is the definition and scope of Energy Transition?
 - What are the drivers (e.g. ESG)?
- Session 2: Commercial Outlook
 - What is the industry response (e.g. electric vehicles, hydrogen economy, crude-oil-to-chemicals, etc.)?
 - What is the outlook, short, medium, and long term?

3. Refining petrochemical interface/integration

- Session 1: Refined products as petrochemical feedstocks
 - Olefins and Aromatics
 - Regional balances and outlooks
- Session 2: Process Technology as a function of the percent of chemical feedstocks (a.k.a. Crude-Oil-to-Chemicals)

4. Refinery Flexibility

- Session 1: To increase the percent of the barrel to chemical feedstocks (COTC)
- Session 2: Bio-conversion is to include both co-processing of bio-feedstocks and full bio-conversion

5. Greener Refineries Environmental Impact Overview

- Session 1: Quantification of Greenhouse Gases (GHGs)
- Session 2: Use Greener power and hydrogen

6. Refineries of the Future: Aspirational Design to Net Zero

- Session 1: Profile of refiner's aspirational designs and technical approaches to net-zero designs
- Session 2: Quantitative impact on a world-scale refinery carbon footprint of various technical configurations and product slate considerations (e.g. inclusion of the bio-diesel, chemical decarbonization, products, renewable power generation, and/or plastics recycling via chemical pyrolysis, etc.)

NGL/LPG Market Fundamentals

Lead Instructor: Darryl Rogers, VP, Midstream Oil & NGL

This course provides an in-depth study of the global markets and infrastructure for natural gas liquids (NGLs, including LPG), focusing on why the markets are structured and what pricing means.

Course Outline

1. Introduction to the Gas Industry

- Definitions & Jargons
- Definitions & conventions
- Specifications and contaminants
- Health & safety issues

2. NGL Supply Sources

- Gas processing and LNG
- Refining
- Renewable LPG / bioLPG

3. End Uses & Demand Drivers – Fuels

- Residential/commercial and other premium fuel markets
- Premium vs. clearing markets.
- Competition and substitution

4. End Uses & Demand Drivers – Petrochemicals

- Ethylene, Flexible crackers & feedstock competition
- PDH, BDH, and other chemical uses

5. NGL Regional Supply, Demand & Imbalances

- LPG supply and demand by region
- LPG regional imbalances and trade flows
- Ethane and natural gasoline

6. Global NGL Infrastructure – Supply

- Production and purification
- Storage, Terminals

7. Global NGL Infrastructure – Transportation

8. Global NGL Infrastructure – Demand-Related Assets

- Residential, commercial, industrial, and agriculture
- Autogas
- Marine, agriculture, synthetic gas, and chemicals

9. Pricing – Price Discovery & Benchmarks

- Price discovery and indexes
- Global and regional benchmarks

10. Pricing – Types of NGL Prices

- Exchanges and pricing hubs – transparency and liquidity
- Wholesale, distributor, and retail prices
- Role of subsidies and excise taxes

11. Transportation Costs

- Arbitrage, Waterborne, Overland

12. Trading & Contract Concepts

- Physical vs. paper hedging and trading
- Term vs. spot contracts and pricing formulas
- NGL price forecasting

13. NGL Valuation Economics

- Frac spreads and ethane recovery economics
- NGL valuation in refineries and competing fuel economics.
- Ethylene cash costs

14. Major Players in the NGL Value Chain

- Producers; Midstream and transportation; Commercial

15. Trends & Issues

- Energy Transition, decarbonization, and renewable / bio-LPG
- Chemicals sustainability and circularity
- Disruptive technologies and emerging markets

LNG Market Fundamentals

Lead Instructor: Ilke Karayigitoglu, Senior Director & Head of APAC Gas & Power Consulting

This course provides a fundamental understanding of how the global LNG markets are structured and the setting of regional LNG prices.

Course Outline

1. History of LNG

- Properties, containment systems, and development

2. LNG Market Overview

- Overview of the LNG supply chain covering liquefaction, shipping, and regasification.
- The global LNG demand growth outlook
- LNG demand growth in key markets
- The capacity of new supply projects to meet future demand.
- Sellers, buyers: profile of key and emerging LNG companies, and their challenges.

3. LNG Pricing

- Commercial contracts and pricing formula mechanisms –including oil linkage, hub linkage, Platts JKM, and hybrid formula.
- Contract vs. spot pricing
- LNG contracting trends include indexation type, length of contracts, and contract slope evolution.
- Key drivers behind the short, medium, and long-term regional LNG pricing outlook

4. LNG Shipping

- How global LNG trade works
- Shipping from a trade perspective: fleet size, development, shipping cost, charter rates

5. Market Development and Outlook

- Long-term themes
- What's next for the energy transition

Understanding the Global Petrochemical Industry

Lead Instructor: Dr. Jeff Plotkin, VP - Training, Energy & Chemicals

This course addresses industry profitability fundamentals, including chemical structures and properties, process technologies, cost of production methodologies, key producers, end-use applications, market sizes, and trade patterns across the petrochemical value chains.

Course Outline

- 1. Introduction to Petrochemicals**
- 2. Understanding Petrochemical Feedstocks**
- 3. Introduction to Synthesis Gas (Syngas)**
- 4. Introduction to the Olefins Business**
- 5. Ethylene:** The Largest of the Building Blocks
- 6. Ethylene Economics**
- 7. Propylene:** The Second Largest Building Block, but the Fastest Growing Olefin
- 8. The C4 Olefins:** Butadiene, Butene-1, Butene-2, and Isobutylene
- 9. Aromatic Business Benzene, Toluene, and the Xylenes:** Taking the Complexity out of Aromatics Complexes
- 10. Benzene:** The Most Versatile of the Aromatics
- 11. Toluene:** Transformations Fooling Mother Nature
- 12. Xylenes:** para-Xylene dominates for PTA/Polyester
- 13. Introduction to Polymers**
- 14. Exploring the Ethylene Value Chain:** Dominated by Four Very Commoditized Businesses: Polyethylenes, Chlor-Alkali/EDC/VCM/PVC, EO/MEG, EB/Styrene
- 15. Exploring the Propylene Value Chain:** Bringing Good Things to Life: PP, Cumene/Phenol/Acetone/BPA, PC, Epoxy resins, PF resins, MMA/PMMA, PO, Oxo alcohols, acrylic acid/SAP, Acrylonitrile
- 16. Exploring the C4 Olefins Value Chains:** Key to the Synthetic Rubber Industry: Synthetic rubber (SBR, PBR, Butyl, EPDM, Nitrile), MEK, Maleic anhydride, UPRs
- 17. Exploring the Aromatics Value Chain:** Styrene/GPPS/HIPS/EPS/ABS, Nylon 6 & 66, MDI/TDI/PU, PTA/Polyester/PET
- 18. Exploring the C1 Value Chain:** Ammonia, Methanol, Acetic Acid, VAM, Formaldehyde/UF/PF/MF resins, POM

Petrochemical Benchmarks & Price Forecasting

Lead Instructor: Larry Tan, VP, Chemical Consulting

Explore the underlying energy and feedstock values, variable and fixed costs, and other production cost models. Discover the impact of inherent margin analysis on supply/demand balances and operating rates with recent market developments.

Course Outline

1. Introduction to Price Definitions & Forecasting Methodologies

- Short-term
- Medium-term
- Long-term

2. Short-term Forecasting Techniques

- Linear regression analysis method
- Other techniques (in brief)

Case Study #1: Forecasting the next five months' prices (*selected petrochemical product, polypropylene in this case)

3. Medium-Term Forecasting Techniques

- Integrated Case Study Introduction
- Production Cost Analysis
 - Underlying energy and feedstock values
 - Feedstock, variable, fixed costs, and co-product credits
 - Alternative values
 - Production cost models

Case Study #2: Cash Cost of Production (* selected petrochemical product)

- Historical Return on Investments

Case Study #3: Estimating Historical Return on Investments (ROI)

- Cost Curves Methodology
- Inherent Margin Analysis
 - Supply/demand balances

Case Study #4a: Demand forecast for Year Y

- Impact of operating rates
 - Market momentum & psychology

Case Study #4b: Global supply-demand-trade flow-operating rates planning for Year Y

4. Long-Term Forecasting Techniques

- Return on Investment

Case Study #4C: Forecast medium-long term ROI and prices.

- Diagnostic Checks
 - Price ratios and spreads
 - Regional relationships and arbitrage

Advances in Chemicals Sustainability

Lead Instructor: Mark Morgan, VP, Chemical Consulting

Advances in sustainable chemistry are essential to the environmental and climate challenges we face. The course offers participants an overview of advances in sustainable chemical production and an understanding of how the markets are reacting to these developments.

Course Outline

1. Agricultural Background & Biofuels

- Legislation overview; agri-feedstocks overview and carbon intensity including new fuels.
- Routes to gasoline blending components.
- Routes to diesel/aviation fuel blending components
- Biogas developments, Bio-methanol
- RFNBOs – eFuels, hydrogen, etc.
- Market overview, Manufacturing costs
- Carbon footprint and availability of petrochemical feedstocks

2. Plastics Recycling

- Scoping the challenge, legislation overview
- Market overview and development
- Petrochemical value chain Integration
- Technology Solutions
 - Mechanical; Pyrolysis; Depolymerization; Dissolution; Gasification; New developments
 - hydrothermal liquefaction, etc.
 - Production economics; carbon footprint implications

3. Biodegradable Polymers

- Definitions, legislation overview
- Market overview and development
- Polymer Families and Building Blocks
- Technology Solutions
- Lactic acid/PLA, Glycolic Acid/PGA, polyhydroxyalkanoates (PHA, PHB, etc.), polybutylene succinate/adipate (PBS, PBSA), gasification, new developments
- Production economics; carbon footprint implications.

4. Bio-based Plastics & Intermediates

- Definitions, legislation overview as appropriate
- Market overview and development
- Polymer Families and Building Blocks

- Technology Solutions
 - Bio-based Polyolefins, Bio-based Polyesters, Bio-based Nylons; novel bio-based polymers (bio-PBT, bio-PC, etc.)
- Comparative production economics, carbon footprint implications.

5. Carbon Dioxide

- Market overview and development, major sources
- Technology solutions for CCS/CCSU and re-use
 - Air capture, Amine systems, colored methanol
- Screening emerging applications
- Comparative production economics
- Introduce impact on biofuel/chemical operations.

6. More Sustainable Petrochemical Building Blocks

- Definitions, Legislation overview as appropriate
- Market overview and development – focus on production.
- A reminder of feedstocks, from biofuels, circular plastics, etc.
- Low carbon building blocks and footprint
 - Ethylene (conventional, bio-naphtha/propylene/MTO, circular naphtha/propylene/FCC),
 - Propylene (conventional, bio-naphtha/propylene/MTO, circular naphtha/propylene/FCC/PDH)
 - Benzene (conventional, bio-naphtha, reforming, unconventional)
 - Methanol
- Alternative approaches to reduction in scopes 1, 2, and 3.
 - Cracker electrification,
 - PDH electrification
 - Hydrogen-fired furnaces in steam cracking.
- Comparative production economics
- Impact of developments in CO2 pricing on competitiveness

Agriculture Supply Chain Fundamentals

Lead Instructor: Juan Sacoto, SVP, Head of Agribusiness Consulting, North America

A comprehensive overview of the agricultural supply chain, from supply trends and dynamics to price formation and risk management.

Course Outline

1. The Agri Supply Chain

- What is Supply Chain?
- Supply Chain Framework for Agriculture
- 4-Rs of the Agri Supply Chain:
 - Reliable
 - Resilient
 - Resourceful
 - Redundant

2. Supply Trends and Dynamics

3. Influence of Energy Transition, Population Shifts and Geopolitics

4. Demand Trends and Dynamics

5. Bringing Supply and Demand Together

6. Price Formation

- Commodity Exchanges
- Cash and Brokerage
- Basis

7. Case Studies

- Soybeans
- Coffee

8. Risk Management Mitigation

- Crops
- Proteins
- Crop Nutrients

9. Pulling it Together – how agri overcomes supply chain disruptions

10. Challenges as agriculture meets further requirements

- Consumer preferences
- Biofuels needs
- Decarbonization efforts

Agriculture Commodities: Trading & Risk Management

Lead Instructor: Juan Sacoto, SVP, Head of Agribusiness Consulting, North America

What factors are impacting the costs and prices of agricultural commodities and products? This course will cover how the dynamics of agricultural commodity markets and supply chains react to geopolitical unrest, weather shifts, and increasing demand for crops for biofuel production as part of energy transition policies.

Course Outline

1. Agricultural Markets in Perspective

- Fundamental Supply & Demand
- Evolution of Markets: Trading Physical Commodities
- Staple v Luxury

2. Agriculture & World Markets

- Agriculture Trading Patterns and Players
- How different markets work and behave.
- Specific v Generic Trading
- Arbitrage
- Market Drivers: Fundamental, Geopolitical, Technical

3. Weather, Crop Production, & Government Policy

4. Price Discovery and Futures Markets

- Price Histories: Key Events, Forward curve structure
- Interaction with Energy Markets

5. Transportation & Freight

- Focus on COVID and Ukraine
- Impact on basis

6. Grain Merchandising Using Cash & Futures Markets

- Basis analysis and use
- Cash Settlement
- Trading Instruments: Futures, Swaps, Options

7. Risk Management Concepts

- Long and Short
- Basis vs. Outright risk
- Physical v Financial Exposure

8. Quantifying Risk

- Modeling Financial Risk: VaR, Options, Credit Risk
- Hedging physical positions with different instruments

Bio-feedstocks: Fueling a Path to a Net-Zero Future

Lead Instructor: Mark Morgan, VP, Chemical Consulting

The course will cover current and emerging process technology, energy transition issues, and industry developments concerning decarbonization. It provides the learner with a complete understanding of the biofuels value chain from agriculture, biofuel manufacturing, and downstream into retail transportation fuels and the impact on chemicals markets.

Course Outline

1. Introduction to Biofuels

- Introduction to and Historical Development of Biofuels
- Introduction to Biofuel Policies and Regulations

2. Introduction to Biofuel Markets

3. The Role of Agriculture

- Agricultural Feedstocks
- Technology and Agricultural Feedstocks

4. Fundamental Biofuel Technologies

- 1st Generation Bioethanol
- 1st Generation Biodiesel
- Introducing Alternative Feedstocks for Biofuel Production

5. Advanced Biofuels Technologies

- Advanced Bioethanol
- 2nd Generation/Advanced Biodiesel and Jet Fuel

6. Biofuel Demand & Outlook

7. Decarbonization: Role of Biofuels in Refinery & Chemicals Production

- The Changing Nature of Refining and its Impact on Biofuels
- Adding Value to Biofuels and Selected Biofuel Byproducts

8. Course Summary

Energy Transition Industry Fundamentals

Lead Instructor: Kaushik Burman Roy, Global Director, Energy Training

Urgency around taking action to meet net-zero targets has proliferated, offering new opportunities for those with a good understanding of the energy transition fundamentals. Our future-focused curriculum will equip you with the tools and skills necessary to assess the different technologies of a cleaner energy system, understand the financial implications for energy-intensive industries, and manage the risks of the transition.

Course Outline

1. Energy Transition 101

- Climate change and the energy transition; Net zero international policy targets
- Policies, regulations, initiatives, and other climate strategies
- Greenhouse gas emissions; Technologies of the energy transition

2. Energy and Climate Scenarios - Executive Overview

- Introduction and highlights
- Key themes emerging from long-term analysis
- The 2023 energy and climate outcomes

3. Energy Transition: The Role of Policy and Regulation

- International initiatives on climate change
- Energy Trilemma; the role of energy security, equity & sustainability
- COP 28 outcomes; Integrated mega policy initiatives
- Global competition influencing funding for energy transition
- Role of regulation and permitting in deployment

4. Carbon & Methane: Emissions and Intensities

- What are emissions? Scope 1, 2, and 3
- Emissions: Importance, measuring & monitoring, key stakeholders
- Intensities: Definitions and methodologies

5. Carbon Markets Fundamentals

- Overview of carbon pricing mechanism
- Intro to compliance carbon markets, and voluntary carbon
- Insights into voluntary carbon markets
- Carbon Market trends; CORSIA, CBAM & Article 6

6. Energy & Climate Scenarios - Clean Energy Technologies

- Introduction and highlights
- Renewable technology, Battery technology
- Low-carbon hydrogen
- 2023 Cleantech scenario update

7. Clean Power

- Global clean technology outlook
- Solar, wind, battery storage and electrolyzers

8. Renewables and Power Systems

- Expansion of intermittent (and flexible) renewables in powermarkets and associated challenges
- Renewable curtailment and price cannibalization risk
- Mitigation options; Investments in transmission and broader infrastructure

9. Energy Attribute Certificates

- Introduction to Platts' Energy Attribute Certificates (EAC) price assessments
- Overview of IRECs, RECs and other GOs

10. Hydrogen

- The role of hydrogen in the energy transition
 - The hydrogen value chain, selected end-use cases
- Current status of the global hydrogen market
- Global outlook for hydrogen

11. Carbon Capture - Technology & Market Trends

- Current market overview, CCUS cost analysis
- CCUS Policies, Opportunities and challenges ahead

Energy Markets & ESG

Lead Instructor: Olivier Trecco, Head of ASEAN, Japan, Australia ESG Solutions

Understand how the energy transition is shaping global energy markets as the growing relevance of ESG factors continues transforming financial markets and influencing investor behavior.

Course Outline

1. Introduction to Key Concepts

- Climate Change, Scope 1, 2 and 3 Emissions
- Sustainability, ESG, and Responsible Business
- The Role of Energy

2. The Energy Transition

- Historical Perspective
- The Transition Going Forward
- What Companies are Doing

3. Sustainability & ESG

- Historical Perspective
- Elements of “Environmental”, “Social”, “Governance”
- Public Sentiment and Alphabet Soup

4. Implications for Energy Markets

- Security, Affordability, and Trends

5. ESG & Financial Markets

- Overview of ESG/Sustainable Finance
- Measurement, Reporting, Disclosure, and Regulation
- Case Studies

6. The Way Forward

- Energy Transition Outlook
- Controversies and Key Question

Hydrogen Market Fundamentals

Lead Instructor: Jenny Yang, Senior Director, Asia Gas and LNG

Hydrogen markets are evolving in line with the global transition towards cleaner energy sources, and there is growing interest in hydrogen as a potential alternative to traditional fossil fuels. However, challenges and uncertainties exist related to its role in the energy mix and its potential to contribute to decarbonization efforts.

Course Outline

1. The Hydrogen Economy

- Different types of hydrogen
- Hydrogen production pathways
- Hydrogen's complementary role
- Advantages & limitations of the hydrogen economy

2. Hydrogen Market & Demand

- Supply / Demand
- Critical points
- Required infrastructure and its effect on market and demand
- Requirements and barriers

3. Effect of the Hydrogen Market on Other Industry

- The big-three-W on the hydrogen market
- Hydrogen market and other industries
- Hydrogen and manufacturing

4. Technology Status & Costs

- Relevance of projects
- Moving from hydrogen colors to carbon intensity

5. Ammonia

6. Policy Drivers

7. Outlook: How will Hydrogen Markets Evolve?

- Trends
- Major How fast can hydrogen scale?
- Hydrogen shift: Essential Considerations
- Leveraging opportunities
- How will hydrogen change the market?

Carbon Markets Fundamentals

Lead Instructor: Roman Kramarchuk, Head Energy Scenarios, Policy & Technology Analytics

The actions to meet net zero targets has increased globally, creating new opportunities for those who understand the fundamentals of carbon markets and how they support the wider energy transition. Our future-focused curriculum will equip you with the tools and skills to tap into these nascent opportunities.

Course Outline

1. Carbon Markets Fundamentals

- Compliance Carbon Markets & Pricing
 - Carbon trading (ETS) versus carbon tax
 - Global compliance markets and pricing schemes
 - Regional specifics and development in key economies (G20)
- The voluntary Carbon Markets
 - What is the VCM and how does it work?
 - Key VCM bodies, stakeholders and participants
 - Demand-side: buyers' perspective, preferences and making claims
 - Trading: ratings, exchanges, and barriers
 - Global & regional trends
- Article 6 & Global Carbon Linkages
 - What is Article 6 and what does it do?
 - Progress of 6.2 and 6.4 mechanisms
 - EU Carbon Border Adjustment Mechanism (CBAM)
 - Carbon clubs

2. Carbon Pricing

- Carbon Markets and Pricing Overview
 - Why do we need a carbon price?
 - What are carbon pricing tools and how do they work?
 - Different types and purposes of carbon markets and pricing
 - Overview of different features and dynamics
- How do Carbon Markets and Pricing fit within Global Climate Policy?
 - A global challenge: politics & economics of climate change
 - Comparison of climate policy instruments
 - UN frameworks: the Paris Agreement,

UNFCCC, COP process and the Sustainable Development Goals (SDGs)

- Key global institutions on carbon markets

3. Carbon scenarios

- Fundamentals of net-zero
 - Understand net-zero cases and how they translate into potential GHG emissions outcomes that could arise in uncertain markets.

4. Carbon Accounting

- Cross-cutting view of carbon intensity for different commodities.
- Different frameworks, use cases and how industries can apply carbon accounting

5. Carbon Registries

- Overview of the critical infrastructure required to manage all your global carbon, water, and biodiversity credits in a centralized, financial markets-based registry system.
- Nature-based solutions (NBS) and natural climate solutions (NCS)?
 - Linkages between NBS, land-use and agriculture
 - Biodiversity as a metric and crediting
 - Reporting requirements relating to climate and nature-based risks

6. Opportunities for Industry

- Overview of sustainability products, insights & solutions
- Corporate strategies for carbon management
- Carbon investments
- NBS & Biodiversity: The size of the prize and its potential
 - Opportunities and challenges for scaling, implications

Power & Renewables Market Fundamentals

Lead Instructor: Xizhou Zhou, VP and Managing Director, Global Power and Renewables

Recent policy decisions worldwide have increased investment in renewable energy technologies causing new challenges and opportunities for market players. The rise in wind and solar deployment in power systems originally built for firm generation creates potential complications, while a localized approach to analyzing power market regulatory frameworks is necessary due to regional differences.

Course Outline

1. Carbon Markets and Pricing Overview

- Supply: Roles of conventional and renewable sources, installed capacity, additions, retirements
- Demand: Traditional drivers like population and economic growth and new drivers such as transportation and heating electrification
- Cost: levelized cost of electricity (LCOE) of different technologies - coal, gas, nuclear, hydro, onshore and offshore wind, solar photovoltaic (PV), battery storage, and other relevant sources
- Role of different types of generation resources and need for dispatchable firm power.
- Price formation: regulated versus liberalized wholesale markets, capacity markets, ancillary service markets, retail prices.
- Role of the grid: transmission as a source of reliability
- Demand drivers: traditional demand drivers and new demand drivers such as transportation & heating electrification
- Reliability requirements and concerns
- Supply chain concerns and bottlenecks
- Long-term (2050) outlooks by RTO: demand, generation, capacity additions, capacity retirements, hourly wholesale prices, capacity prices, renewable captured prices, ancillary service markets.
- “Fast Transition” outlook: What does a fully decarbonized north American power system look like?
- Utility & developer strategies in a decarbonized world
- Other regional outlooks
 - Latin America
 - Europe
 - Africa & Middle East
 - China
 - South & Southeast Asia
 - OECD Asia

2. How do Carbon Markets and Pricing fit within Global Climate Policy?

- How are power markets designed today to fulfill the main functions of the electric system?
- What are some of the key regional differences in regulations and market design?
- How do these new policy developments impact clean energy development?
- What major challenges do regulators and policymakers face in adjusting to a variable renewable-dominated power system?

3. Compliance Carbon Markets & Pricing

- North America:
 - Role of the IRA and tax credits
 - State policies and drivers
 - Capacity markets, accreditation, market design
 - Infrastructure: grid interconnection, transmission

4. Global renewable investment attractiveness rankings: What factors to take into consideration when investing in renewable energy?

- Competitiveness
- Grid accommodation
- Market fundamentals
- Profitability
- Ease of business
- Market size
- Regulatory framework

5. Consumers: driving renewable investment

- The role of corporate clean energy buyers in the renewable market
- Ways in which large energy consumers can procure clean energy in different markets
- Trends in renewable Power Purchasing Agreements (PPAs)

Biographies

Selected S&P Global Experts Energy and Chemicals

Oil Market Fundamentals, Price Forecasting & Commercial Strategies

Lead Instructor: Jim Burkhard, VP, Head of Research,
Oil Markets, Energy & Mobility



Jim Burkhard

Vice President, Head of Research, Oil Markets, Energy & Mobility

Jim Burkhard is a vice president and heads S&P Global Commodity Insights crude oil research and energy and mobility research on how the automotive ecosystem impacts demand and influences the energy and automotive industries. Jim is vice president and head of crude oil market and energy and mobility research. He is responsible for the development and coordination of Insights and messages for global and regional oil markets and scenarios. His expertise covers geopolitics, industry dynamics, and global oil demand and supply trends. He has more than 20 years of experience in energy markets. He also leads research into how changes in the automotive ecosystem are impacting the future of the energy and automotive industries. He led the ground-breaking S&P Global study, *Reinventing the Wheel (RTW): The future of cars, oil, chemicals, and electric power*. RTW has been cited by numerous press outlets around the world including the Wall Street Journal, the Financial Times, CNBC, Bloomberg, and media outlets in China, Europe, and India.

Jim has led the development of each generation of S&P Global scenarios that bring together the entirety of energy research to form an integrated global outlook for the future of energy. The 2006 scenarios pointed to a major debt-induced global crisis two years before the 2008 recession; and in 2011, identified the roadmap to \$50 oil by 2014/15. Also, in early 2020, his team was the first to identify the scale of production cuts that would materialize in the US and OPEC+ members in the second quarter of the year.

Jim has testified before the US Congress on energy issues and is frequently sought for comment by global media. He has participated in several US National Petroleum Council (NPC) studies that provide policy recommendations to the US Secretary of Energy on oil and gas issues. Prior to joining Cambridge Energy Research Associates before its acquisition by S&P Global, he was a member of the US Peace Corps in Niger, West Africa, where he directed infrastructure projects to improve water availability and credit facilities.

Jim holds a BA from Hamline University and an MS from the school of Foreign Service at Georgetown University.

Fundamentals of Refining Economics

Lead Instructor: Daniel Evans, VP, Global Head of Fuels and Refining Research



Daniel Evans

Vice President, Head of Global Refining and Marketing research

Daniel Evans, S&P Global Vice President, leads our Fuels and Refining research. The team Daniel leads is responsible for our global and regional short-term refined product supply, demand, price and margin outlooks, and detailed downstream market research. Daniel's team also contributes to the long-term forecasting efforts and delivers global base oil, lubricants, and fuel retail research.

Daniel has been involved in developing our work on the future of energy and mobility and lead studies focused on decarbonization pathways for trucking, aviation and shipping.

Prior to joining S&P Global, Daniel worked for Statoil in corporate strategy where he was responsible for analyzing global business opportunities and framing the strategic investment context for senior management.

Daniel holds a Masters degree in Civil Engineering from Leeds University, and studied jointly at the University of California, Berkeley.

NGL/LPG Market Fundamentals

Lead Instructor: Darryl Rogers, VP, Midstream Oil & NGL



Darryl Rogers

Vice President, Midstream Oil & NGL

Darryl is responsible and accountable for company's flagship NGL markets subscription product, Waterborne LIVE LPG subscription product, and the US NGL Markets Weekly subscription product.

Along with leading these subscription based offerings, he serves as a focal point for consulting projects, integrating the unmatched technical/market expertise and resources from our upstream, natural gas, NGL, downstream, and chemicals teams to provide client-focused solutions.

Darryl has 17+ years of industry experience and expertise in natural gas, LNG, power and cogeneration, ethylene manufacturing, petroleum coke, hydrogen and other industrial gases. Darryl has 10+ years of consulting and research and analysis experience including his employment at Purvin & Gertz. Before joining S&P Global (Now part of S&P Global) through the acquisition of Purvin & Gertz, he was at The Dow Chemical Company.

Darryl holds a Bachelor of Science from Western Carolina University, a Bachelor of Science from North Carolina State University and an MBA from Louisiana State University, United States.

LNG Market Fundamentals

Lead Instructor: Ilke Karayigitoglu, Senior Director & Head of APAC Gas and Power Consulting



Ilke Karayigitoglu

Senior Director & Head of APAC Gas and Power Consulting

Ilke Karayigitoglu has nearly two decades of consulting and industry experience in the energy business at S&P Global Commodity Insights.

Ilke's experience extends across the entire energy value chain, including upstream, downstream, LNG, power, and renewables. He has worked with international oil companies, national oil companies, power utilities, independent energy companies, oil service companies, and government agencies. Throughout his career, Ilke has advised on various gas, LNG, and power market issues in Asia Pacific. He also has deep expertise in gas and LNG markets in Southeast Asia and pricing of gas and LNG. His experience includes leading multiple global or Asia-focused gas infrastructure investment opportunity identification, screening, and strategy projects in diverse areas such as upstream gas, floating LNG, regasification terminals, gas pipelines, LNG-fired power generation, and solar power generation. Before joining S&P Global, Ilke was director of Gas & Power Consulting at Wood Mackenzie in Singapore. Prior to that, he held posts at Schlumberger Business Consulting in Singapore; Mercer in Chicago; and Turkish downstream energy company Aygaz in Istanbul.

Ilke holds a Bachelor of Science in industrial engineering from Istanbul Technical University in Turkey and an MBA from the University of Chicago in the United States.

Understanding the Global Petrochemical Industry

Lead Instructor: Dr. Jeff Plotkin, Vice President, Chemical and Energy Training



Dr Jeff Plotkin

Vice President, Chemical and Energy Training

Dr. Plotkin brings over three decades of experience working for operating companies and consulting firms in the petrochemical industry to his position as head of S&P Global Chemical and Energy Training for the Oil, Midstream, Downstream, and Chemical (OMDC) markets. He is internationally recognized as a gifted educator on the subjects of the technology and business of petrochemicals. Dr. Plotkin is co-author of a popular chemical textbook entitled "Industrial Organic Chemicals, third edition" (Wiley Interscience, 2012) and a contributing editor of the American Chemical Society's Patent Watch online.

Dr. Plotkin holds 30 U.S. patents and has authored more than 25 publications in peer-reviewed journals. Before joining S&P Global, Dr. Plotkin served as Nexant/Chem System's training programs vice president. Dr. Plotkin's industrial experience includes working in research for Exxon Chemical and in marketing and product management for ISP. Dr. Plotkin holds a Doctor of Philosophy in Organometallic Chemistry from the University of Pennsylvania, US., and a Master of Business Administration from PACE University, New York City, US. He also served as a post-doctoral research fellow at the Ohio State University, Columbus, Ohio, US with a minor in psychology.

Benchmarks & Petrochemical Price Forecasting

Lead Instructor: Larry Tan, VP, Chemical Consulting for Oil Markets, Midstream, Downstream & Chemicals



Larry Tan

Vice President, Chemical Industry Consulting for Oil Markets, Midstream, Downstream & Chemicals

Mr. Larry Tan has more than three decades of experience in the oil refining and petrochemical sectors within Asia and the United States. He is frequently invited to share his market views at petrochemical industry conferences and conduct bespoke in-house training for petrochemical industry subjects. In addition to prior work as a consultant, Mr. Tan's spent the bulk of his career with ExxonMobil Oil and Chemicals in various functional areas of increasing responsibility, including process engineering, technical, refinery operations, catalytic research, and development (in the U.S.), supply operations, vessel chartering, manufacturing planning, joint venture commercial oversight (aromatics) and sales and marketing (aromatics and olefins). After he left ExxonMobil, he traded olefins and aromatics for European firms covering the Asian markets. At S&P Global, Mr. Tan has been in Chemical Consulting and Training since 2013. His project focus has been commercial and technical due diligence, market entry and strategy-related studies, project feasibility studies, commercial advisory, transfer pricing, pricing strategy, trading support, competency skills training workshops, and litigation support.

Bio-feedstocks: Fueling a Path to a Net-Zero Future / Advances in Sustainable Chemicals

Lead Instructor: Mark Morgan, VP, Chemical Consulting



Dr Mark Morgan

Vice President, Chemicals Consulting

Mark Morgan leads business development activities in chemical consulting focused on specialty chemicals, renewables and advanced materials.

Mark has dedicated more than two decades to consulting in specialty chemicals, process technology and industrial biotechnology. In addition, to chemicals consulting, he supports work in other S&P Global business units where chemicals and materials are involved, in particular Aerospace, Defence and Security (AD&S). In 2011, he joined Chemical Market Associates, Inc. (CMAI) to lead its global activities in renewables.

Previously, he was with Chem Systems, a leading boutique consulting firm serving chemicals and allied industries. His work covered lenders advisory work, M&A due diligence, project feasibility, technology validation and valuation, legal work and more. Following service in the army, he began his chemicals career with BP undertaking blue sky research as well as plant support, together with taking new ideas from concept to commercialization.

Mark earned his doctorate in chemical physics at the University of Bristol, United Kingdom.

He leads consulting projects in all regions in specialty chemicals, biotechnology, renewables and advanced materials. He has strong experience across multiple specialty chemical value chains; linear alpha olefins, detergent alcohols, surfactants, nutraceuticals, the C4 chain, the C5 chain, specialty aromatics, biodegradable polymers, bio-based building blocks, engineering polymers, higher performance materials, carbon fiber, construction chemicals, food/feed additives, valorizing cracker by-product streams, etc. Mark has also undertaken lenders advisory work - commercial and technical for small and large capital projects, as well as supporting due diligence processes in M&A transactions, venture capital, etc.

Agri Supply Chain Fundamentals / Agriculture Commodities: Trading & Risk Management

Lead Instructor: Juan Sacoto, SVP, Head of Agribusiness Consulting, North America



Juan Sacoto

SVP, Head of Agribusiness Consulting, North America

Juan Sacoto, Senior Vice President and Head of Agribusiness Consulting for North America with over 25 years of industry and consulting experience. Juan's experience involves business strategy, risk management, market feasibility and competitiveness, economic modeling & forecasting, economic development and M&A due diligence.

Juan has extensive experience across several regions (US, Canada, Mexico, Brazil, Argentina, China, Japan, Korea, Ukraine, Russia, and Southeast Africa) and is fluent in English and Spanish. He received his bachelor's degree in finance and postgraduate degree in business (MBA).

Selected Experience Consulting and Research: Led and managed a wide variety of regional and global projects across most agribusiness segments including biofuels. - Agriculture inputs - Grain and oilseed processing, animal feed, livestock and meat - Biofuels and biofuel feedstocks (vegetable oils, low carbon feedstocks and new feedstocks) - Sustainability and carbon sequestration- Agribusiness/ commodity supply chain economics (grains, proteins, processing, etc.)

Strategic Planning: Worked with clients to develop strategic plans for new investments, future growth, new product introduction, risk management, M&A,

Energy Transition Industry Fundamentals

Lead Instructor: Kaushik Burman Roy, Global Director,
Energy Training



Kaushik Burman Roy

Global Director, Energy Training

Kaushik leads our Energy Training, globally. He is responsible for leading training efforts on Energy Transition (Carbon, Renewables, Nuclear, Electricity, Methane, Hydrogen, Ammonia, Energy Attribute Certificates), and Energy and Generating Fuels (LNG, gas, oil, coal, lubricants, petrochemicals).

Prior to joining S&P Global, he worked for 30 years in the Energy Industry, having worked for some of the world's largest energy companies, including ExxonMobil and Shell in upstream, downstream and petrochemicals.

He is a Chemical Engineer (IIT-Kharagpur, India), MBA (IIM-Ahmedabad, India) and Masters in Education (US).

Energy Markets & ESG investing

Lead Instructor: Olivier Trecco, Head of ASEAN, Japan, Australia
ESG Solutions



Olivier Trecco

Head of ASEAN, Japan, Australia ESG Solutions

Olivier Trecco is the Head of ASEAN, Japan, Australia ESG Solutions at S&P Global Sustainable1. Before to joining S&P Global, Olivier was co-Head of the ESG Solutions team at Natixis Investment Managers Solutions, helping clients – with a focus on institutional Investors – with their ESG and Climate needs.

Prior to joining Natixis Investment Managers, Olivier was a director with Natixis CIB, working on advisory solutions for institutional clients. He worked before that for the French Insurance Regulator, the ACPR, on the European negotiations leading to the finalization of Solvency II.

Olivier is a graduate from both the Institut d'Etudes Politiques de Paris (Sciences PO) and the Paris School of Economics.

Carbon Markets Fundamentals

Lead Instructor: Roman Kramarchuk, Head Energy Scenarios, Policy & Technology Analytics



Roman Kramarchuk

Head Energy Scenarios, Policy & Technology Analytics

Roman leads efforts to analyze the impacts of the energy transition – driven by policy changes and technology advancements – on the energy sector, with special focus on clean energy technologies (i.e., hydrogen, stationary storage, electric vehicles/alternative transport, renewables, etc.). He oversees Future Energy Outlooks content, advising clients on medium- and long-term energy market views (including reference case and 2-degree scenarios). Roman launched and continues to oversee the Greenhouse Gas and North American Environmental Markets – content areas - covering analytics and outlooks around carbon/environmental markets & policies.

Prior to joining PIRA, now part of S&P Global Commodity Insights, he was at the U.S. EPA, developing key power plant and industrial emissions regulations at the Clean Air Markets Division. With PG&E and before that at PA Consulting / PHB Hagler Bailly, he evaluated strategies regarding power sector fuel choice, capital investments and trading. Roman also worked on international projects to develop power markets and regulatory capacity in Ukraine, Armenia and India. At the Federal Reserve Board, Roman analyzed trends in industrial production.

He has an M.P.P. from the Harvard Kennedy School and a B.A. in economics and B.S.E. in systems engineering from the University of Pennsylvania.

Hydrogen Market Fundamentals

Lead Instructor: Jenny Yang, Senior Director, Asia Gas and LNG



Senior Director, Asia Gas & LNG

Based in Singapore, Jenny's recent research includes China's energy market reforms, Chinese companies' LNG procurement strategies, the impacts of China's gas demand and related policies on the global gas and LNG market, and the potential role of hydrogen in China's energy mix under the government's carbon ambitions. She regularly presents and moderates C-level executive dialogs at industry conferences including CERAWEEK, LNG and Hydrogen Gas Market Forum, International Energy Executive Forum, and Asia Gas Forum.

Jenny also has extensive knowledge of electricity load forecast and peak demand management, pricing and structuring of electricity products, power retail operations, and electricity market deregulation. Prior to joining S&P Global, she was vice president of pricing, products, and markets at Constellation NewEnergy in Houston, Texas. Earlier, she was a quantitative analyst at Williams Companies, where she produced forward-looking price and volatility curves for energy-related trading commodities.

Jenny holds a Bachelor of Business and Administration and a Master of Business and Administration from the University of Oklahoma, United States.

Power & Renewables Market Fundamentals

Lead Instructor: Xizhou Zhou, VP and Managing Director, Global Power and Renewables



Xizhou Zhou

Vice President and Managing Director, Global Power and Renewables

Xizhou has expertise in power and renewable market fundamentals analysis and forecasting, power market design and policy analysis, renewable energy business models, and company strategies, among other areas. He previously headed the firm's Power, Gas, Coal, and Renewables practice in Asia Pacific while based in Beijing, where he significantly expanded the group's research and consulting coverage across the region with new teams established in Singapore, Seoul, Tokyo, Delhi, Penang, and Brisbane.

Xizhou began his career at S&P Global through one of its predecessor companies, Cambridge Energy Research Associates (CERA), as part of its Emerging Markets and Global Power groups in Cambridge, Massachusetts. Before that, he worked as a consultant on regulatory economics for Industrial Economics, Inc. in Boston and as a research analyst at the World Resources Institute in Washington, DC. Fluent in Mandarin Chinese and proficient in Spanish. He serves as an editorial board member of China Petroleum Society's official journal, Guoji Shiyou Jingji (International Petroleum Economics). He is currently based in Washington, DC. Xizhou holds a Bachelor of Arts and a Master of Environmental Management, both from Yale University in the United States.

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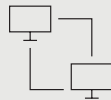
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