



PB INSTITUTE OF RESEARCH AND TECHNOLOGY

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Nairobi - Kenya

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Gas-to-Liquids Processes & Technologies Training Course

Duration: 5 days

On-Site

01 Who Should Attend

- Oil and gas professionals
- Natural gas processing specialists
- Petroleum and chemical engineers
- Process engineers
- Production and operations engineers
- Refinery and petrochemical professionals
- Gas processing plant managers
- Energy project managers
- Oil and gas business development professionals
- Energy economists and financial analysts
- Technical and commercial managers
- HSE and environmental professionals



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02 About the Course

The **Gas-to-Liquids (GTL) Technology Overview Training Course** provides participants with a comprehensive understanding of the technologies, processes, economics, applications, and operational considerations involved in converting natural gas into high-value liquid hydrocarbon products. The course introduces the complete GTL value chain, from **natural gas processing and syngas production through Fischer–Tropsch synthesis, hydrocracking, refining, and final product upgrading**. Participants will examine how GTL technology can be used to monetize stranded or remote natural gas resources while producing cleaner liquid fuels and specialty products. The training explores major GTL process configurations, catalysts, feedstock requirements, plant design considerations, energy efficiency, emissions management, operational challenges, and product quality. It also examines the commercial and strategic factors influencing GTL project development, including capital requirements, feed gas availability, product markets, technology selection, project economics, and environmental considerations. Through practical examples and industry case studies, participants will gain the knowledge needed to understand GTL projects and evaluate their technical, commercial, and strategic potential..



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03 Workshop Objectives

- Master syngas production and gas processing techniques.
- Utilize Fischer-Tropsch synthesis and reactor design.
- Implement product upgrading and refining processes.
- Design and build robust GTL plant operational plans.
- Optimize GTL plant safety and environmental compliance.
- Troubleshoot and address common challenges in GTL operations.
- Implement GTL product quality control and measurement standards.
- Integrate GTL technologies with existing natural gas infrastructure.
- Understand how to manage large-scale GTL projects.
- Explore emerging technologies in GTL (e.g., micro-GTL, advanced catalysts).
- Apply real world use cases for GTL in various energy applications.
- Leverage GTL tools and frameworks for efficient implementation.

04 Module Topics

Module 1: Introduction to GTL Technology

- Fundamentals of gas-to-liquids (GTL) technology.
- Overview of GTL processes and applications.
- Setting up a GTL implementation framework.
- Introduction to GTL equipment and systems.
- Best practices for GTL technology.

Module 2: Syngas Production



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- Mastering syngas production and gas processing techniques.
- Utilizing steam reforming and partial oxidation.
- Implementing gas purification and conditioning.
- Designing and building syngas production units.
- Best practices for syngas production.

Module 3: Fischer-Tropsch Synthesis

- Utilizing Fischer-Tropsch synthesis and reactor design.
- Implementing fixed bed and slurry reactors.
- Utilizing catalyst selection and optimization.
- Designing and building FT synthesis units.
- Best practices for FT synthesis.

Module 4: Product Upgrading and Refining

- Implementing product upgrading and refining processes.
- Utilizing hydrocracking and isomerization.
- Implementing product separation and distillation.
- Designing and building product upgrading units.
- Best practices for product upgrading.

Module 5: Operational Plans

- Designing and build robust GTL plant operational plans.
- Utilizing maintenance and surveillance programs.
- Implementing operational procedures and guidelines.
- Designing and building operational budgets.
- Best practices for operational planning.

Module 6: Plant Safety and Compliance



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- ▶ Optimizing GTL plant safety and environmental compliance.
- ▶ Utilizing safety protocols and risk assessment.
- ▶ Implementing emissions monitoring and control.
- ▶ Designing and building safety management systems.
- ▶ Best practices for safety.

Module 7: Troubleshooting GTL Operations

- ▶ Troubleshooting and addressing common challenges in GTL operations.
- ▶ Analyzing system performance and equipment issues.
- ▶ Utilizing problem-solving techniques for resolution.
- ▶ Resolving common operational errors.
- ▶ Best practices for troubleshooting.

Module 8: Product Quality Control

- ▶ Implementing GTL product quality control and measurement standards.
- ▶ Utilizing product analysis and testing.
- ▶ Implementing quality assurance and control.
- ▶ Designing and building quality control systems.
- ▶ Best practices for product quality.

Module 9: Integration with Gas Infrastructure

- ▶ Integrating GTL technologies with existing natural gas infrastructure.
- ▶ Utilizing natural gas pipelines and processing units.
- ▶ Implementing integrated control and monitoring.
- ▶ Designing and building integrated GTL systems.
- ▶ Best practices for integration.

Module 10: Large-Scale GTL Projects



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- Understanding how to manage large-scale GTL projects.
- Utilizing project management tools and techniques.
- Implementing program evaluation and reporting.
- Designing scalable GTL solutions.
- Best practices for project management.

Module 11: Emerging GTL Technologies

- Exploring emerging technologies in GTL (micro-GTL, advanced catalysts).
- Utilizing micro-GTL and modular systems.
- Implementing advanced catalysts and reactor designs.
- Best practices for advanced applications.
- Designing and building advanced GTL systems.

Module 12: Real-World GTL Use Cases

- Applying real world use cases for GTL in various energy applications.
- Utilizing GTL for synthetic fuels and lubricants.
- Implementing GTL for chemical feedstocks.
- Utilizing GTL in remote and off-grid applications.
- Implementing GTL in associated gas monetization.
- Best practices for real-world applications.

Module 13: GTL Tools Implementation

- Leveraging GTL tools and frameworks for efficient implementation.
- Utilizing process simulation software and databases.
- Implementing data analytics and monitoring tools.
- Designing and building automated GTL workflows.
- Best practices for tool implementation.

Module 14: Monitoring and Metrics



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- ▶ Implementing GTL project monitoring and metrics.
- ▶ Utilizing GTL performance indicators and KPIs.
- ▶ Designing and building monitoring systems for GTL projects.
- ▶ Optimizing monitoring for real-time insights.
- ▶ Best practices for monitoring.

Module 15: Future Trends in GTL

- ▶ Emerging trends in GTL technologies and applications.
- ▶ Utilizing digital twins for GTL system simulation.
- ▶ Implementing advanced process control and optimization.
- ▶ Best practices for future GTL management.