KBC

A Yokogawa Company

Engineering and Design

Companies involved in the design stage of upstream and downstream projects face growing challenges as the oil and gas industry transitions from a fossil fuel infrastructure to renewable energy systems, introducing greater project complexity and new delivery models. Projects are now smaller in scale but more intricate, often involving advanced technologies. Engineering and design companies must adapt quickly to develop expertise in digital tools. At KBC we have a range of software products to help with project design while minimizing costs and maximizing utilization, reliability and accuracy.

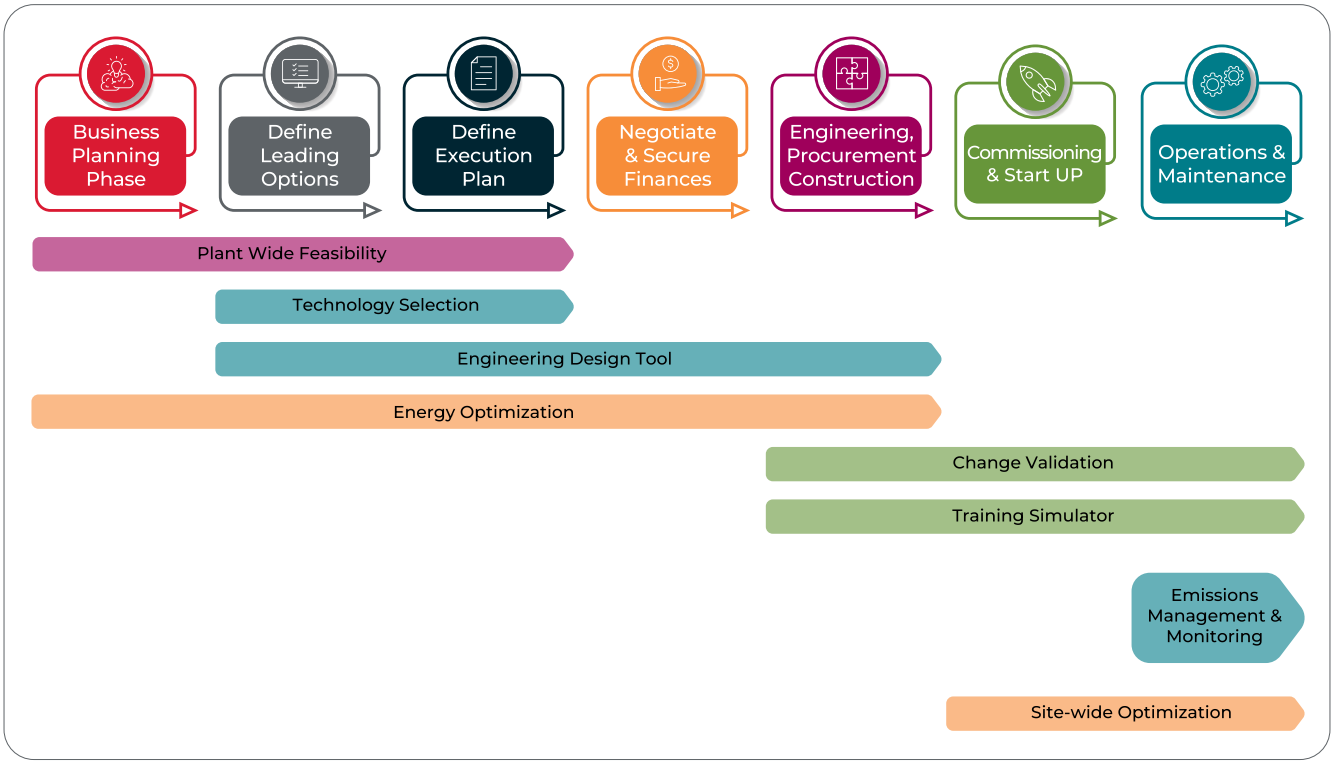
Bringing
DECARBONIZATION
to Life®

A Flexible Solution for Business Needs

As an engineering company, you need the flexibility to use design software in a way that aligns with your project needs. The KBC Engineering Package provides access to KBC's comprehensive suite of simulation technologies in a flexible, scalable format that supports you throughout the project lifetime. Covering the full hydrocarbon value chain from upstream operations to refineries, LNG facilities, petrochemical plants, and polymer production the package enables consistent, high-quality engineering across all stages of design and delivery.

Design Software for Downstream Operations

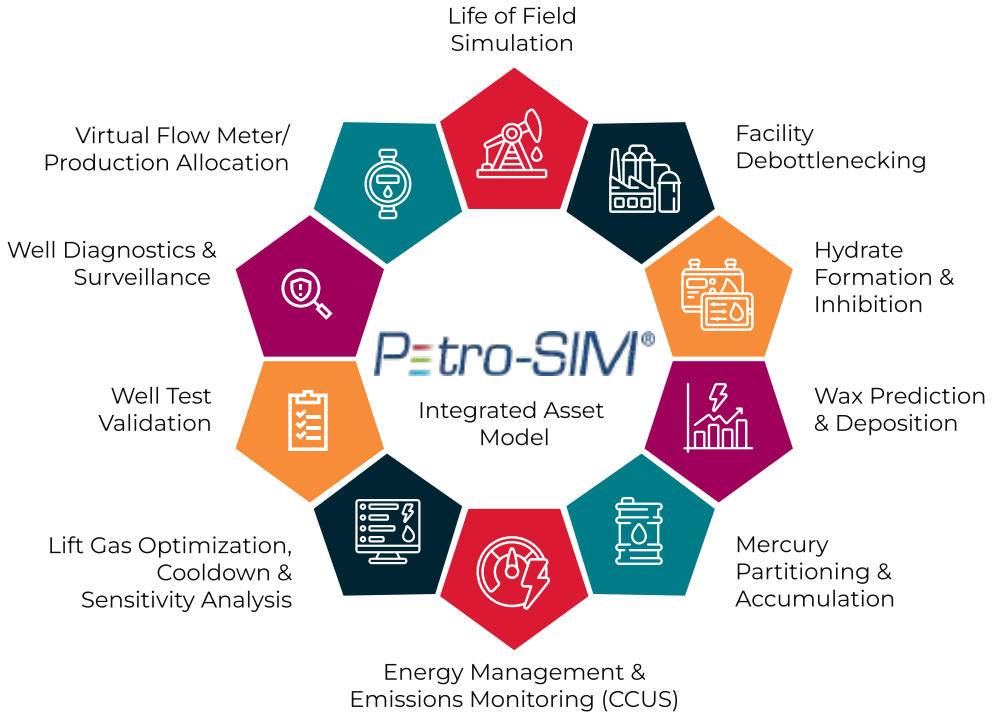
KBC's downstream offering enables integrated process and emissions modeling through its proprietary first principles simulation technology. At the core is Petro-SIM®, a robust and proven process simulator built on a solid engineering framework that combines rigorous simulation with digital twin capabilities. Petro-SIM supports asset-wide modeling, enabling you to assess interactions between process units, utilities, and emissions, and evaluate trade-offs in an integrated process, emissions, economics and utilities model. The versatility of Petro-SIM makes it ideal for process engineering, design, feasibility studies, and decarbonization planning using hydrotreatment, electrolysis, gasification, RWGS, Fischer-Tropsch, flare system design and chemical plastic recycling technologies, supporting better decision-making and enhanced operational value.



Design Software for Upstream Operations

Integrated Asset Modeling (IAM) delivers upstream operators a unified, end-to-end view of the asset - from reservoir to processing facilities - enabling more informed decisions from conceptual design to operations. By integrating our industry-leading simulation technologies, Multiflash®, Maximus®, FloWax® and Flaretot™, IAM provides a consistent and comprehensive platform for modeling complex assets throughout the entire life of the field. Multiflash offers advanced PVT modeling to evaluate the physical properties of complex fluids, while Maximus supports integrated production and transport network simulation in steady states and life of field, both are complemented by FloWax which simulates and predicts wax deposits along pipelines. The addition of Flaretot allows engineers to design, monitor and analyze flaring to reduce emissions.

Key Applications of IAM - A Single Cohesive Network



Tailor Your Design Package

The KBC Engineering Package is a chips-based package, designed to maximize concurrent usage and offer exceptional scalability across projects. Use your chips to buy the software you need when you need it. You'll have access to any of the included modules and flexibility to tailor solutions to specific project needs. With multi-period term contracts, the package can be adapted to project timelines and changing requirements. As a pay-per-use model it ensures cost efficiency, enabling companies to minimize expenses while maximizing utilization throughout the project lifetime.

Flexible

You're in control of how much and how often you use the technology in the engineering package giving you the flexibility to adapt the software use to your needs.

Scalable

Use the software based on the needs of your teams for an unrestricted, scalable solution that maximizes concurrent usage.

Customer Support

With a 98% satisfaction rate for our customer support, you will be in safe hands throughout your onboarding, training and support.

Multi-period Contracts

Choose your contract term to align with your project timings and flex your software usage throughout the duration of the contract.

Modules Included in the KBC Engineering Package

Process Simulation

Petro-SIM steady state and dynamic process simulator is a powerful solution for engineers and operators seeking to optimize energy management, emissions tracking, and process performance. With seamless integration into Microsoft Excel, data historians, and industry-leading tools like Multiflash and Maximus, Petro-SIM enables precise simulation of individual units, particularly gas turbines, furnaces, and heat exchangers, as well as refinery-wide simulation. Its ability to automatically generate heat and material balances, along with comprehensive datasheets, streamlines workflows and enhances efficiency. By leveraging advanced third-party add-ons such as HTRI® Xchanger Suite®, OLI Systems electrolytes chemistry engine, MySep® for separators, and Predici-SIM for polymer production process modeling, Petro-SIM stands out as the market leader for steady-state and dynamic process simulation, delivering unparalleled accuracy and operational insight.

Renewable Diesel

The Hydrotreating and Isomerization Simulator is designed to optimize the conversion of bio-based feeds, such as triglycerides (TGLs) and free fatty acids (FFAs), into high-quality paraffins for renewable diesel (HVO) and sustainable aviation fuel (SAF). This advanced simulation tool supports both co-processing with conventional fossil-based feeds and 100% bio-feed processing, ensuring flexibility in refinery operations. It facilitates the isomerization of paraffins into isoparaffins, significantly improving cold flow properties essential for fuel performance. Utilizing hydrotreating technology and a noble metal zeolitic bifunctional catalyst, the simulator enables efficient hydroprocessing while also offering the capability to selectively crack diesel-range paraffins, allowing refiners to optimize yield distribution between renewable diesel and SAF production.

Electrolysis

The steady state and dynamic Electrolyser simulator is a comprehensive tool designed to model and analyze three key water electrolyser technologies: Proton Exchange Membrane (PEM), Alkaline (ALK), and Solid Oxide Electrolysis Cell (SOEC). It offers three calculation modes — Simple Mode, Parametric Mode, and Semi-Rigorous Mode — providing flexibility in simulation accuracy and complexity. The simulator includes advanced features such as automatic saturation of hydrogen and oxygen products with water, water recycling with dissolved gases, and hydrogen crossover modeling, enhancing its realism and predictive capability. Additionally, its dynamic modeling capabilities make it suitable for Operator Training Simulators (OTS) and transient analysis, supporting both steady-state and time-dependent electrolyser performance evaluations.

Sustainable Aviation Fuel

The Fischer-Tropsch Simulator for Sustainable Aviation Fuel (SAF) production is a sophisticated tool designed to model and optimize the conversion of syngas into liquid hydrocarbons. It maintains rigorous heat and material balances, ensuring accurate process evaluations while calculating incremental changes per reaction segment. The simulator includes UA-based heat transfer rating to assess thermal performance effectively. Additionally, it incorporates a kinetic model for both cobalt (Co) and iron (Fe) catalysts, enabling precise reaction predictions. Comprehensive kinetic tuning covers all key reactions, including Fischer-Tropsch synthesis, methanization, the water-gas shift (WGS), alpha and beta growth mechanisms, and catalyst deactivation, ensuring high-fidelity simulation for SAF production.

Flare System Design and Analysis

Flaretot™ is a comprehensive tool for designing and modeling flare piping networks with an intuitive graphical interface. It features an integral component-based physical property module, enabling precise calculations for flare radiation, pollutant dispersion, and noise impact. The simulator allows for flare stack sizing based on allowable radiation limits, incorporating water and fixed shield attenuation calculations to assess both radiation and noise effects. Advanced capabilities include contour plots for multi-flare radiation and pollutant dispersion, as well as detailed flame temperature and composition analysis for flared and flameout scenarios. Additionally, the tool provides noise calculations for multiple flares, piping, and valves, ensuring a thorough evaluation of system performance and environmental impact.

PVT Modeling

Multiflash is a comprehensive PVT modeling and physical properties software designed to handle complex fluid behaviors across multiple phases, including gases, liquids, and solids. With an extensive database of over 250 pure components, it enables accurate phase behavior predictions for various mixtures, ensuring reliable assessments for reservoir fluids, flow assurance challenges, and process simulations. It's robust capabilities support CO_2 and H_2-rich mixtures in CCS and hydrogen production and transport applications, predicting hydrates formation even in the presence of impurities. Multiflash facilitates the modeling of entire sequestration facilities, from carbon capture to storage, providing a powerful tool for evaluating mitigation strategies and optimizing fluid management across industries.

Integrated Production and Transport Network Modeling (IPM)

IPM software provides a comprehensive solution for field planning, enabling the simulation of an entire asset from the reservoir to surface facilities throughout the field's lifespan. With fast and accurate compositional thermo-hydraulic Life of Field simulations, IPM ensures precise modeling of complex networks while incorporating realistic operating strategies. By identifying key constraints to operable flow, it enhances understanding and facilitates better decision-making. The software improves collaboration between engineering disciplines, streamlining workflows to achieve optimal designs more efficiently. Additionally, IPM transitions seamlessly into operational phases, enabling day-to-day field optimization, pressure balancing, and CO_2 storage estimation across various scenarios, ultimately enhancing facility and operational efficiency.

Flow Assurance

The integration of Multiflash advanced thermodynamics across the suite ensures robust flow assurance modeling capabilities for complex, multiphase systems. It supports the design and optimization of hydrates inhibition injection over a field's lifespan, asphaltene precipitation, mercury partitioning and wax deposition mitigation strategies to reduce flow interruptions, extend equipment life, and maintain production targets.

A Comprehensive Suite of Software

The KBC Engineering Package combines several design modules. The following are its key features and benefits.

Market Problems	Solution Features
Advanced Technology	
Navigating rapidly emerging technologies that lack established design standards or proven performance data, increasing uncertainty and risk in early-stage project planning.	New purpose-built reactors for elctrolyzers, HVO/SAF systems, and Fischer-Tropsch have been specifically designed to meet the demands of the energy transition.
Integrated Energy Systems	
Balancing the integration of new, low-carbon energy systems with legacy infrastructure, while managing performance, safety, and economic trade-offs across the full asset lifecycle.	A fully integrated, sitewide model combines energy, emissions, and economic analysis to evaluate process pathways under various energy transition scenarios.
Lifecycle Performance	
Pressure to deliver beyond CAPEX, engineering companies must now design for the total lifecycle performance, including digital twin integration, operations and maintenance optimization, and real-time monitoring.	Petro-SIM lays the foundation for digital twins and predictive analytics, supports continuous commissioning and operator training, and enables closed-loop optimization through real-time plant data integration.
Design Validation	
Design errors and inefficiencies drive costly rework, schedule overruns, and budget inflation, often due to limited validation of process decisions under real-world conditions.	Detailed unit and sitewide modeling capabilities validate process designs under various operating conditions before physical implementation, minimizing costly rework and delays.
Adaptable Software Use	
Project uncertainty, shifting scopes and variable workloads create challenges in planning, resource allocation, and maintaining engineering consistency from concept through to delivery while keeping project costs under control.	The KBC Engineering Package provides flexibility to adapt to evolving project scopes and workloads throughout the project lifecycle.
Automated Documentation	
Delays in producing accurate engineering documentation hinder project timelines and reduce agility in responding to design changes or client requirements.	Flexible and easy-to-use tools automate the creation of key process engineering deliverables, including heat and material balances and equipment datasheets.
Accurate Prediction Tool	
Inaccurate prediction of phase behavior and physical properties of complex fluids undermines process equipment sizing and instrumentation, increasing the risk of costly design revisions.	Seamless integration with Multiflash ensures accurate modeling of complex fluids and reliable calculation of physical properties for proper equipment sizing.

Specialized Calculation Tool	
Lack of access to advanced design tools limits the ability to perform highly specialized calculations for equipment design, sizing, rating, and material selection with the required precision.	Petro-SIM integrates with leading industry tools such as HTRI, MySep, OLI, and Sulcol™, enabling advanced design, rating, and material selection capabilities.
Industrial Energy System Design	
Designing complex energy systems is hampered by the absence of specialized tools for modeling steam, power, and heat recovery networks at scale.	Energy unit operations allow comprehensive modeling of steam production and distribution systems, turbine-based power generation, and steam condensate collection within a unified platform.
Design of Pressure Relief Devices	
Designing pressure relief systems across multiple emergency scenarios is complex and time-consuming, often requiring manual coordination across various tools.	A single platform to manage the sizing and rating calculation of pressure relief valves and rupture disks, including associated installation piping, to handle a wide range of emergency scenarios.
Compliant Flare System	
Designing compliant flare systems is challenging without a robust platform that ensures conformance with safety standards and minimizes environmental impact.	A single robust platform supports the compliant design of flare systems, ensuring adherence to acceptable radiation and noise levels while minimizing environmental impact and emissions.

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