Designing Bio-Fuel Processes using aspenONE® Engineering

Enabling companies to design and optimize bio-fuel processes to maximize operational effectiveness

Overview

aspenONE Engineering is an integrated set of tools for design and operation of bio-fuel plants, from conceptualization through plant start-up and operations support. It enables companies to simulate, build, and operate safe, competitive, and more reliable bio-fuel plants, while reducing capital and operating costs, increasing engineering efficiency and quality, and accelerating time-to-market with payback in weeks.

aspenONE Engineering is used by EPC firms, top producers, and government research laboratories to design and optimize bio-fuel plants and processes.

The Challenge: Meet Growing Bio-Fuel Demands, Safely and Efficiently

Renewable bio-mass-based technologies such as low-carbon emission bio-diesel and bio-ethanol are increasing in popularity because of high oil prices and government incentives for the use of alternative fuels. However, to be successful, companies need to confront the following challenges:

- Growing demand for affordable, lower carbon emission bio-fuels
- Intense activity in construction of bio-fuel plants worldwide
- Volatility in process innovation and process cost that result from the exploration of alternative crops and cellulosic ethanol
- Pressure to optimize feedstock selection and efficiently recover co-products
- Quick and reliable cost estimates for design alternatives, which are crucial to the bidding process

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The AspenTech Solution: Modeling Improves Process, Drives Production

AspenTech has been in the process modeling business for over 30 years, providing model-centric integrated solutions to the process industries. Our Process Engineering tools remain the preferred solution for modeling advanced bio-fuel processes today.

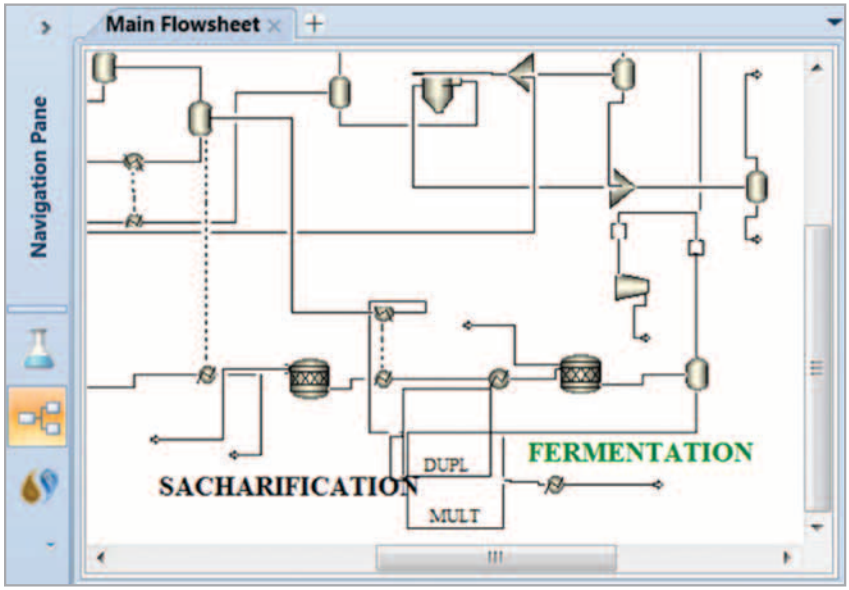
Customers have used AspenTech models for:

- Corn-Starch Plants
- Dry and Wet Mill Corn-to-Ethanol Processes
- Cellulose-to-Ethanol Processes
- Bio-mass Gasification Processes
- Pressure Swing Absorption

Aspen Plus® is the most widely used modeling environment for designing important ethanol activities:

- Milling
- Transformation – Hydrolysis, Saccharification, Fermentation
- Distillation and Dehydration
- Energy Utilization
- Co-products Recovery
- pH Control

aspenONE Engineering also enables bio-fuel companies and EPC firms to estimate capital and operating costs for process alternatives, size equipment such as heat exchangers and distillation columns using industry-accepted methodologies, and re-use models to support operations after the plant is built.



Corn-to-Ethanol Process in ***Aspen Plus***

Designing Bio-Fuel Processes using aspenONE™ Process Engineering

Integrated Lifecycle Solution

aspen ONE Engineering addresses each phase of the process lifecycle, enabling companies to develop the most economical and reliable bio-fuel plants.

Conceptual Design/R&D

Key products: Aspen Plus, Aspen Plus Dynamics, Aspen Rate-Based Distillation, Aspen Batch Modeler, Aspen Process Economic Analyzer, Aspen Energy Analyzer, Aspen Chromatography, Aspen Properties

- Develop optimal process designs and transform non-conventional substances used as feedstocks to chemicals
- Analyze trade-offs between design alternatives
- Identify optimal operating conditions and bottlenecks to improve yield, throughput, and quality
- Reduce energy-related emissions
- Simulate pressure, thermal, and vacuum swing adsorption processes, common in ethanol dehydration units
- Simulate chromatographic processes, including those applicable to the separation of sugars
- Leverage an extensive library of models by National Renewable Energy Laboratory (NREL) and the United States Department of Agriculture (USDA)
- Activated Energy and Economics help users make better design decisions in real time without expertise in pinch analysis or process costing - results can be handed over to specialist departments for thorough analysis with Aspen Energy Analyzer and Aspen Economic Evaluation

Basic Engineering

Key products: Aspen Basic Engineering, Aspen Economic Evaluation

- Aggregate large volumes of data from various sources regardless of geographic proximity
- Populate process deliverables with accurate and consistent information
- Enable collaborative global project execution and management
- Reduce cost, revision cycles, and elapsed time in detailed design phase

Engineering & Procurement

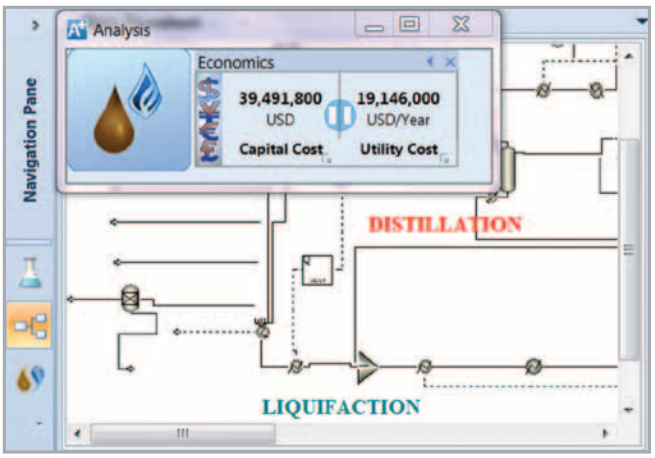
Key products: Aspen Exchanger Design & Rating Suite

- Efficiently design, optimize, rate, and simulate heat exchangers
- Reduce capital costs by optimizing equipment designs for a given set of process conditions
- Improve mechanical design quality by utilizing extensive materials data banks together with accurate thermal data resulting in accurate stress calculations
- Perform both rigorous thermal and mechanical design using Aspen Shell & Tube Exchanger and Aspen Shell & Tube Mechanical

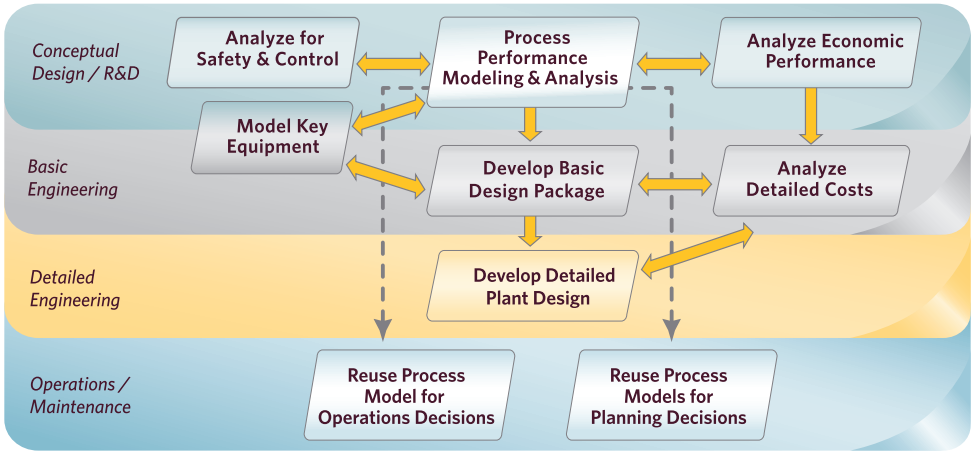
Operations

Key products: Aspen Simulation Workbook™, Aspen Online Deployment™

- Implement off-line decision-support tools for troubleshooting and analysis
- Deploy models to casual users through Microsoft® Excel-based interfaces
- Implement online (24/7) advisory applications
- Drive continuous improvement to meet operational excellence initiatives



Perform Economic Analysis During Process Simulation



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Empower Your Company to Succeed

aspenONE Engineering is an integrated lifecycle solution—from conceptual design through plant startup and operations support—enabling you to model, build, and operate safer, more efficient and more competitive process plants. AspenTech's Engineering Professional Services helps ensure that your project achieves its maximum potential by leveraging our unparalleled industry expertise to design, analyze, debottleneck, and improve plant performance. Combined with our world-class 24/7 technical support service, flexible training options, including online training from within the software, proprietary search engine to locate and re-use models and data, and local language product availability, AspenTech provides the resources to enable your company to meet and exceed its business objectives.

About AspenTech

AspenTech is a leading supplier of software that optimizes process manufacturing—for energy, chemicals, engineering and construction, and other industries that manufacture and produce products from a chemical process. With integrated aspenONE® solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing, and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs, and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit **www.aspentech.com**.

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