

Aspen PIMS (**P**rocess **I**ndustry **M**odeling **S**ystem) – the foundation of AspenTech's powerful, easy-to-use family of petroleum downstream value chain solutions – is a decision support solution that enables refiners and petrochemical producers to achieve dramatic productivity increases while improving overall supply chain agility and profitability. The industry standard for petroleum industry planning, Aspen PIMS is used by more than 75% of the refineries, and more than 60% of all petrochemical plants, in the world.

## The Challenge

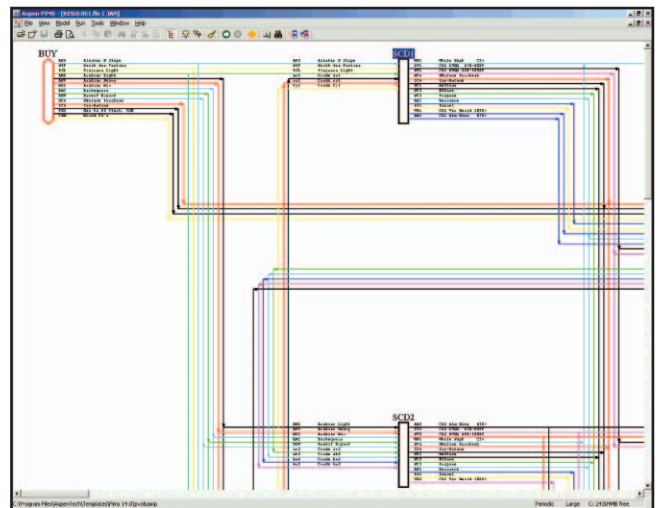
Refiners and petrochemical producers face a climate of industry consolidation, increased competition, growing safety and environmental mandates, and a booming internet culture. Their fundamental challenge is to respond to these variables while still developing the most profitable operating plans, meeting regulatory demands, and making key decisions about capital expenditures for both compliance and profit improvements. To do so, they must also consider the following:

- Alternative feedstocks and prices
- Alternative products and prices
- Product blending specifications
- Process plant configurations
- Capital improvements
- Purchases, sales, and trades
- Inventories, imports, and exports

## The Solution: Aspen PIMS

Aspen PIMS allows refining and petrochemical companies to develop optimal planning models that balance the complexities of today's environment with maximum fidelity. It provides these benefits:

- **Increased profits** through model accuracy and flexibility. Aspen PIMS enables true modeling of key planning work processes, including model analysis, crude and feedstock selection, production planning, operations planning, and blending. Aspen PIMS models include feedstock and intermediate options with price tiers, crude fractionation, and property representation.



- **Reduced operating costs** through a streamlined planning process that enables improved asset utilization, utility right-sizing, utilities reduction, and loss reduction
- **Sustained value** through common process models, consistent model validation and calibration methods, and custom reporting.

Aspen PIMS optimizes the operation and design of refineries, petrochemical plants, and other industry facilities; and can be used for a wide variety of short-term and strategic planning purposes, such as:

- Evaluation of alternative feedstocks
- Optimization of product slates
- Evaluation of grassroots opportunities and/or expansions

## Features

- **Linear and non-linear modeling capabilities.** Successive linear programming (SLP) is the primary non-linear feature. Aspen PIMS also offers generalized non-linear recursion, interaction blending, additive blending, and mixed integer modeling, including special ordered sets capability.

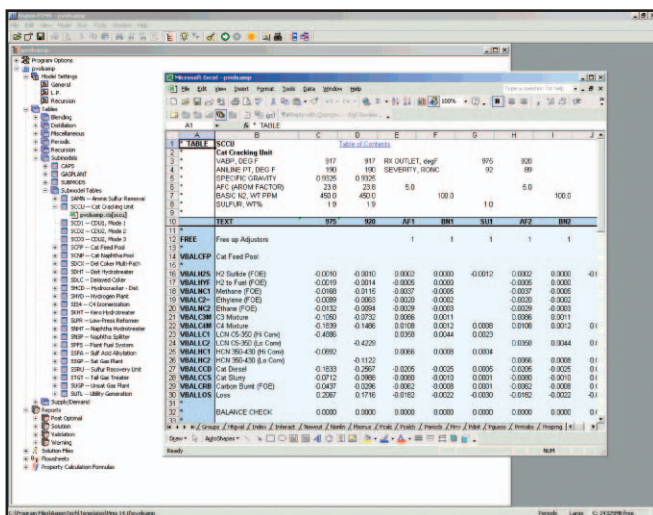


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- **Integration with spreadsheet workbooks.** Input and maintenance of model data is easy and efficient through the spreadsheet interface.
- **Integration with databases.** Aspen PIMS integrates easily with Microsoft Access, SQL-Server, and Oracle.
- **Sophisticated Microsoft Windows graphical user interface.** Model management, data management, matrix generation, solution, and reporting are all accessible through the user interface.

## The Aspen PIMS Solution

The base Aspen PIMS system, which solves up to 1000 model constraints, is enhanced by **Turbo PIMS**, which enables the user to build larger, more complex models (up to 16,000 rows). The combination of the Aspen PIMS system and Turbo PIMS is the foundation for several other PIMS applications, including the following:

### PIMS-EE

Aspen PIMS models have traditionally been contained in spreadsheets and stored locally on the user's computer, making it difficult to share, maintain, and control versions of the model. PIMS Enterprise Edition (PIMS EE) stores models in a central relational database, and offers role-based security and multi-user access. Users can share the same model without having to copy files between computers, and can access individual model tables. Furthermore, storing models in a relational database facilitates integration with other enterprise systems and ensures a high degree of data integrity not available with spreadsheets.

### MPIMS

MPIMS allows users to link together a number of single-plant Aspen PIMS models in order to form a complex multi-source, multi-plant, multi-market supply/demand/ distribution network. An MPIMS model can be comprised of up to 100 single-plant Aspen PIMS local models, together with one additional global model, which defines the supply/demand/distribution implications.

## PPIMS

PPIMS allows users to solve complex multi-period problems, such as modeling inventories. PPIMS models can consist of multiple time periods of user-defined length, and can include all of the powerful distributive recursion capabilities across the time periods. The implications of inventory qualities that vary with time are also accurately simulated for their true economic implications.

## PIMSPlus

PIMSPlus is a set of mathematical productivity tools that significantly increase the already-powerful Aspen PIMS system. Included in PIMSPlus are:

- **PIMS-SI**, which provides the interface between Aspen PIMS to rigorous non-linear process simulators such as the Aspen Cat Cracker Model for refineries and the Spyro yield simulator for olefins plants
- **PIMS-MIP**, which models activities requiring integer values; and optimizes mutually-exclusive processes, threshold purchases, and throughputs
- **PIMS-SC**, which performs matrix calculations on one or more submodels without running PIMS; and provides fast and efficient submodel validation and post-optimal data analysis
- **PIMS-XNLP**, a proprietary non-linear optimization solution algorithm which requires no changes to the PIMS model; and optimizes weight-based quality recursion pooling in volume-based model automatically
- **PIMS-ABML**, a portfolio of linear and non-linear blending prediction methods and correlations that provide blend technology and modeling consistency.

## Other Aspen PIMS Products

- **PIMSXCHG**, a powerful tool that adds sophisticated integration capabilities between Aspen PIMS programs and any ODBC-compliant databases, online data systems (such as Aspen InfoPlus.21), and oil movement and blend control systems
- **LPIMS**, a multi-language product which allows PIMS users to set GUI options and solution reports in a language of his/her choice
- **Aspen Report Writer**, a report writer which consolidates data from different sources into easy-to-read, customizable reports without Aspen PIMS programming
- **Planning Model Accuracy (PMA)**, which enables dynamic backcasting and updating of PIMS models. Included in this application are Aspen Performance Scorecard, Planning vs Actual (PVA) and the Aspen PIMS submodel calculator. For highly non-linear processes, it can sometimes be beneficial to use rigorous non-linear simulation directly within the Aspen PIMS optimization process. PIMS-SI (Simulator Interface) allows users to interface the Aspen PIMS model to an external simulator for this purpose.

Aspen Technology, Inc.  
Model: pmspm1 CASE: BASE CASE  
Capacity Utilization --- Period Totals

	JAN	FEB	MAR	APR	Total
	31 DAY	28 DAY	31 DAY	30 DAY	90 DAY
011 CRUDE UNIT 01	1,781,148	592,267	1,248,888	3,832,416	
012 CRUDE UNIT 02	1,268,888	828,888	1,268,888	4,176,888	
001 HCC UNIT 01	688,518	287,278	588,278	1,888,828	
002 HCC UNIT 02	888,818	375,817	828,278	2,888,183	
011 HCC UNIT 01	92,181	47,151	85,883	226,256	
012 HCC UNIT 02	127,788	65,888	128,888	322,564	
HSP HSPA SPLITTER	647,782	289,811	732,843	1,618,266	
HSE HSPA HYDROTRT	378,268	218,888	592,885	1,187,937	
LFR LFR-P REFORMER	553,181	172,176	731,881	1,458,139	
HSE HSPA HYDROTRT	178,871	71,888	87,181	337,138	
HSE HSPA HYDROTRT	15,588	35,731	79,378	138,689	
CSB CSB HYDROTRT	7,988	248,888	1,822,888	2,179,888	
CSB CSB HYDROTRT	7,988	2,275	8,282	18,543	
CSB CSB HYDROTRT	182,588	8	184,182	366,770	
SFA SFA HILF ACID ALKY	288,777	88	289,856	578,633	
CSB CSB HYDROTRT	885,888	288,887	888,888	1,888,156	
CLC CLC HYDROTRT	885,888	282,888	885,888	1,874,888	
HSE HSE PLANE	855	321	333	1,788	
HSE HSE UNIT 1	3,288	1,741	3,889	8,888	
HSE HSE UNIT 2	3,199	1,748	3,888	7,995	
CSB CSB HYDROTRT	181	92	98	372	
HSE HSE PLANE	378,888	88,115	888,216	1,755,219	
CSB CSB HYDROTRT	9,888,815	2,888,818	18,281,289	23,059,888	
HSE HSE PLANE	1,758,883	392,788	1,828,882	3,878,558	
CSB CSB HYDROTRT	15,858	5,283	21,888	47,888	
CSB CSB HYDROTRT	15,858	5,283	21,888	47,888	
CSB CSB HYDROTRT	11,375	2,891	15,888	28,711	
CSB CSB HYDROTRT	8,855	2,182	8,888	18,875	
CSB CSB HYDROTRT	8,855	2,182	8,888	18,875	
CSB CSB HYDROTRT	33,871	11,993	36,193	82,057	
CSB CSB HYDROTRT	33,871	11,993	36,193	82,057	
CSB CSB HYDROTRT	25,955	8,187	28,283	62,245	
CSB CSB HYDROTRT	18,882	5,853	18,281	48,296	
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CSB CSB HYDROTRT	35,278	7,783	39,289	82,332	

## Why AspenTech?

Aspen Technology, Inc., provides industry-leading software and implementation services that enable process companies to increase efficiency and profitability. AspenTech's manufacturing/supply chain product line allows companies to increase margins in their plants and supply chains, by managing customer demand, optimizing production, and streamlining the delivery of finished products. Its engineering product line is used to design and improve plants and processes, maximizing returns throughout an asset's operating life. These two offerings are combined to create solutions for enterprise operations management (EOM), integrated enterprise-wide systems that provide process manufacturers with the capability to dramatically improve their operating performance.

Over 1,500 leading companies already rely on AspenTech's software, including 46 of the world's leading chemical companies and 23 of the world's largest refiners.



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