



SAS® for Oil and Gas

Create intelligence from new data sources and deliver information for effective decision making across the enterprise

Burgeoning demand in emerging economies. Competition for leasing rights and financial capital. Increasing public scrutiny and regulatory demands for transparency. Delivery of a product with aging assets and the threat of a retiring workforce. This is the state of affairs for the world's energy industry.

In this environment, oil and gas companies are seeking opportunities to improve processes and technologies to remain competitive. Upstream oil and gas companies need integrated views of their production processes all the way from the reservoir to the pipeline. They must optimize their processes and perform predictive analysis of production problems to minimize losses. In downstream operations, oil and gas companies need integrated monitoring of the conditions and performance of their refining plants. And meeting demand for petrochemical and refined products will require integrated diagnostics that predict variability in product quality, determine root causes of maintenance issues and enable improved asset optimization.

Finally, boom and bust cycles have taken their toll on the industry, producing large gaps between young, inexperienced employees and older employees who have the skills and experience necessary for seamless operations. Oil and gas companies must continue to modernize and automate key processes such as forecasting, planning and oil field simulation analyses to manage growing demand with fewer people as retirements increase.



Challenges

- Preventing production losses due to unexpected shutdowns, discovering root causes, and optimizing plant and corporate performance.
- Accounting and planning for severe price volatility for feedstocks and end-products (e.g., gasoline and natural gas), which requires advanced forecasting techniques and integrating forecasts with trading and risk management capabilities.
- Balancing near- and long-term asset development by exploring in more geologically complex and remote areas and optimizing production equipment to extract assets at an expected pace.
- Reporting on compliance with health, safety and environmental regulations.
- Providing relevant and timely insights to decision makers along the entire value chain.



Achieve peak performance

■ Key Benefits

- Improve uptimes, performance and availability of upstream and downstream assets.
- Manage fuel price and feedstock volatility.
- Optimize exploration in mature fields and in unconventional sources.
- Meet regulatory demands.
- Improve production efficiency and refining margins.
- Provide collaboration among stakeholders to enable better understanding before making critical decisions.

How SAS® Can Help

Oil and gas company leaders around the world rely on the power of SAS to deliver the predictive maintenance, forecasting and analysis, and energy trading and risk management systems needed to effectively manage the world's longest supply and process chains, from the wellhead to the retail gas pump. With more than three decades of experience delivering industry-leading capabilities in data integration, advanced analytics and business intelligence, SAS provides everything needed for oil and gas companies to create intelligence from new data sources and deliver information for effective decision making across the enterprise.

Capabilities

Facility Integrity and Reliability

SAS provides an analytics-based framework to improve uptimes, performance and availability of crucial assets while reducing the amount of unscheduled maintenance, thus minimizing maintenance-related costs and operation disruptions. With state-of-the-art analytics and reporting, you can predict maintenance problems before they happen and determine root causes in order to update processes for future prevention. The approach reduces downtimes, optimizes maintenance cycles, reduces unscheduled maintenance and gains greater visibility into maintenance issues.

Demand Forecasting

SAS equips you with the power to gain valuable insights about the markets for your commodities, whether there are disruptions to supply or weakening of demand. These insights span the past, present and future, enabling effective responses to unexpected changes, improvement of short-term results and future matching. Forecasting with SAS predicts patterns of consumption behavior using a wide and increasing range of factors. Understanding and quantifying these factors helps to build better, more accurate forecast models.

Data Quality

Upstream and downstream oil and gas companies rely on data for oil field work, plant operations, workforce management, regulatory compliance and downstream marketing. Upstream companies need clean, uniform data to create the analytics for reserves-exploitation decisions. Downstream refining companies continue to look for ways to improve and automate their refining and marketing processes, adding more data sources to their management systems. Transforming that data into useful, high-value information can help the refiner make wider ranges of administrative, operational and management decisions to make and sell products. SAS helps ensure consistency across silos in both upstream and downstream operations, enabling geoscientists and engineers to perform deterministic and interpretive assignments without being encumbered with data preparation.

Exploration and Production Optimization

Upstream exploration and production companies need the ability to perform exploratory data analysis by scrutinizing the data across all upstream domains. They need to be able to integrate cleansed data from geophysics, geology and reservoir engineering, generate spatial models or variograms, and incorporate data from various databases and other niche market applications for uncertainty analysis. Using an optimized data portfolio, oil and gas companies can develop plans for their resources with well analysis, reserves evaluation, and quantification and qualification of risk and uncertainty.

Components

Predictive Asset Maintenance

SAS Predictive Asset Maintenance enables organizations to increase revenues by reducing asset and plant downtime. The solution helps you predict events that can cause outages to reduce unplanned maintenance and achieve optimized, sustainable maintenance strategies with minimal disruption to production. As a result, you can maximize the use of maintenance resources to meet operational goals for profitability, safety and environmental compliance.

Data Integration

SAS Data Integration provides the foundation for supporting anticipated new data influxes by helping you transform your operational data into useful information. It provides capabilities for enterprise data access and processing across systems and platforms – including internal processes, third-party or regulatory sources, the Web and more. SAS Data Integration also helps ensure information excellence through data quality lifecycle management. And an interactive, visual data integration development environment enables collaboration and easy reusability across your organization, all with a single point of IT administration.

Energy Trading and Risk Management

SAS utilizes the solutions of its RiskAdvisory division to provide energy trading and risk management (ETRM) solutions and business intelligence tools that enable organizations to proactively capture, analyze and simulate market and credit risks in volatile energy and commodity markets. World-class risk analytics, modeling and reporting capabilities, delivered in an integrated framework, offer a portfolio-level view that enhances risk management and strategic decision making. SAS® BookRunner® provides organizations with the ability to proactively capture, analyze and simulate market and credit risks associated with energy commodity price volatility. Through an integrated ETRM framework, SAS BookRunner delivers a portfolio-level view to measure, manage and control energy risk.

Success Stories

- [Petrobras](#) (Brazil) manages more than 100 production platforms, 16 refineries and more than 6,000 fuel stations. Using SAS to find oil, they are achieving record results, including a daily record output of over 2 million barrels of oil on a single day, doubling the previous record. Petrobras also uses SAS to support decision-making processes, which has improved project profitability.
- [Snam Rete Gas](#) (Italy) concentrates on transporting natural gas, and must ensure the proper allocation of nominated quantities at more than 7,000 delivery points, including local grids and major industrial and thermoelectric customers. SAS provides large-scale forecasting automation with improved forecast accuracy, providing timely and accurate forecasts at a more granular level of detail. As a result, the company complies with industry regulations and meets its customers' service expectations.
- [ConocoPhillips Norway](#) needed to manage its maintenance performance, as this was its biggest cost. Implementing scorecards powered by SAS contributed to more formal approaches to strategic performance management. SAS allowed the organization to focus on performance by enabling better decision making and cost control.

This front-to-back-office solution includes deal capture, data integration, advanced predictive analytics, compliance reporting and a full suite of sophisticated risk modeling tools.

Forecasting

With SAS forecasting software, you can analyze and forecast processes that take place over time. By identifying previously unseen trends and anticipating fluctuations, you can more effectively plan for the future. Whether you want to understand past trends, forecast the future or better understand how your business functions, we provide a wide range of analytical tools that ensure your success.

Business Intelligence

SAS Business Intelligence gives you the information you need, when you need it, in the format you need. Today's progressive oil and gas companies are rolling out self-service reporting and analysis to everyone's desktop, so decision makers spend less time looking for answers and more time driving strategic decisions.

Advanced Analytics

SAS is unmatched in converting data into the insights needed to respond to completely new situations affecting business operations, in ways that can be tested, evaluated and validated. SAS solutions reduce uncertainty, quantify variability, refine processes and help you allocate resources with greater precision. SAS Analytics provide an integrated environment for predictive and

descriptive modeling, data mining, text analytics, forecasting, optimization, simulation, experimental design and more. From dynamic visualization to predictive modeling, model deployment and process optimization, SAS provides a range of techniques and processes for the collection, classification, analysis and interpretation of data to reveal patterns, anomalies, key variables and relationships, leading ultimately to new insights and better answers faster.

The SAS® Difference

- **Superior data integration capabilities.** Using SAS, oil and gas companies can extract and transform data from nearly any source, identify analytically relevant variables and describe underlying patterns and characteristics of a data set.
- **Relevant experience helping industries adapt to change.** SAS has many years of experience working with a wide range of markets that have faced new challenges. We are a unique provider of solutions that enable transformative change while controlling costs and improving operational decision support, especially in view of workforce changes likely to affect oil and gas company operations.
- **Proven forecasting.** SAS solutions can generate large quantities of high-quality forecasts quickly and automatically, enabling organizations to plan more effectively for the future.

Analysts can generate forecasts that reflect the realities of business, improving your ability to plan future events with confidence, and improve forecasting performance across all products and locations – at any level of aggregation.

- **Predictive modeling.** Because of the wide variety of asset characteristics and changing performance thresholds over its life cycle, it takes the full power of SAS' best-in-class data mining tool to predict asset performance accurately.
- **Integrated reporting and business intelligence.** SAS allows you to access the latest information on key maintenance and reliability performance indicators, including their business impacts and performance trends – as well as create ad hoc charts, graphs and reports – through a Web-based, point-and-click interface, without having to be an expert in statistics.

About SAS

SAS is the leader in **business analytics** software and services, and the largest independent vendor in the business intelligence market. Through innovative solutions delivered within an integrated framework, SAS helps customers at more than 50,000 sites improve performance and deliver value by making better decisions faster. Since 1976 SAS has been giving customers around the world THE POWER TO KNOW®.



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