Past, Present and Future Development

RBAC User Conference 2025, Houston, Texas

The Leader in Energy Market Simulation Systems

Providing energy companies, consultants, and regulators advanced tools to support:

- **Investment and M&A Strategy**
- **Environmental and Sustainability Goals**
- **Credible Risk Analysis**
- **Trading Strategy**
- **Policy Development and Assessment**
- **Energy Security**

Purpose & Legacy

RBAC's mission:
Deliver the most useful analytical tools to the energy industry to empower analysts to explain and improve decision making

Modeling Philosophy:
Transparent modeling of pipeline-specific design enables precision forecasting using real infrastructure, rather than abstract corridors; based on work begun in 1974 and reenvisioned in 1997

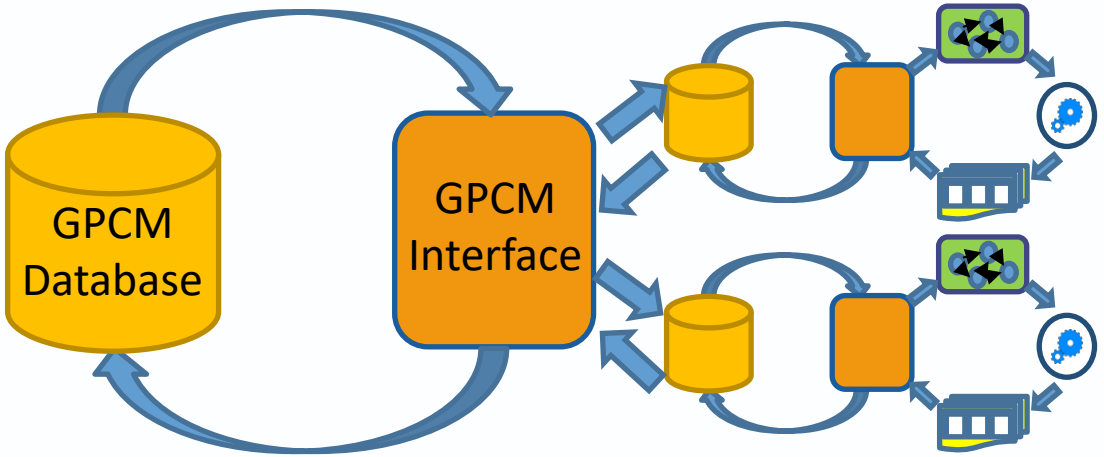
Economic Framework:
Grounded in market-clearing economics and network flow optimization

Model evolution:
from regulatory analysis to market forecasting

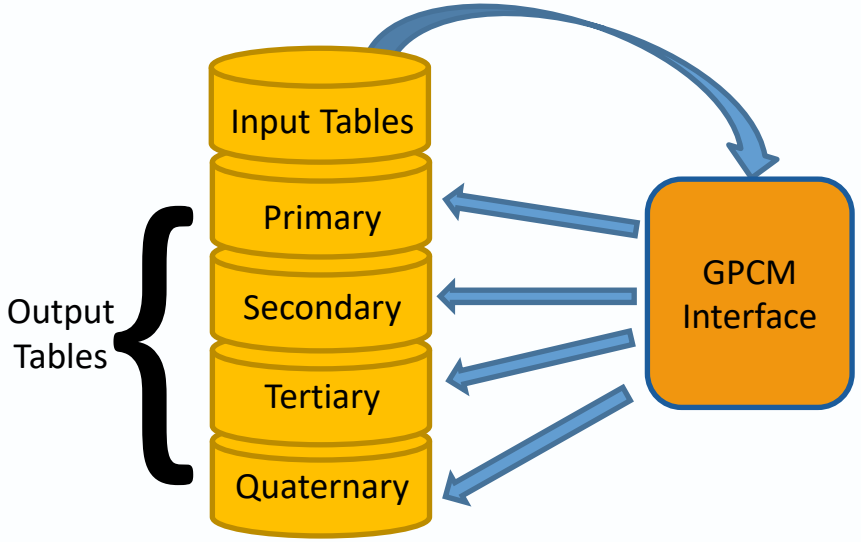
GPCM – Major Milestones

Software Enhancements in the 2020s

- Multi-threaded mode results in ~80% reduction in runtime



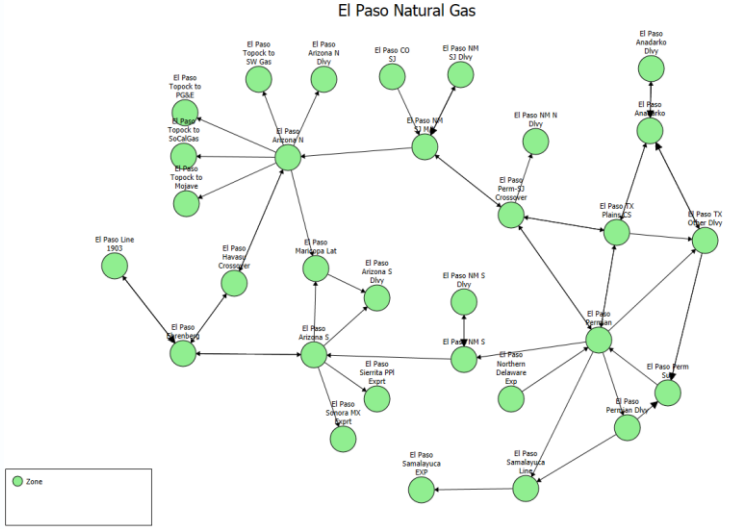
- Multi-file databases for greatly extended capability of GPCM to provide more granularity and expanded detail in results



GPCM – Major Milestones

Software Enhancements in the 2020s

- **GDS Pro** – schematic diagramming tool that visualizes model assumptions and results in an Arc-Node format.



- **GPCM Data Visualizations and Reports**
  A Power BI–based toolkit offering 40+ customizable visuals of key GPCM inputs and outputs, enabling faster scenario analysis, reduced manual reporting, and improved analyst efficiency.

GPCM – Major Milestones

Improved Model Granularity

Zone-level tariffs, capacities (receipt, delivery, throughput), fuel, interconnects, and storage. Supply regions feature production-price relationships using supply curves informed by granular sources like Rystad Energy. Customer regions include demand-price relationships based on sectoral consumption and regression analysis. Storage areas detail injection/withdrawal capacities, costs, and pipeline connections.

North American Base-case (as of 2025):

- 331 pipelines and LNG terminals (296 active)
- 720 customer-location pairs
- 228 supplier-location pairs
- 437 storage facilities (427 active)
- 1,200+ interconnections

Global Expansion – G2M2

RBAC releases G2M2 (Global Gas Market Model)

G2M2 is a global infrastructure model for gas and LNG flows, covering most countries and all LNG shipping and terminal dynamics. Its integration with GPCM enables users to balance global supply and demand, with mutual feedback enhancing both models' analyses.

Infrastructure-based model of global gas and LNG flows:

- 199 geopolitical units (countries or sub-country areas)
- 851 pipelines and 5,000+ interconnections
- 130 LNG export terminals, 362 import terminals
- 62,000 LNG shipping routes

Python Toolchain – A New Technical Direction

Modular Python tools introduced:

- GDS Map Pro – spatial visualization
- rGraph – time series graphing and filtering
- rDashboard – customizable dashboards

Recent Research:

- SDF Pathways – using python to generate all paths gas takes from sources to destinations, dynamically, from users' results.

Our tools are built for both standalone and integrated use—whether you're reviewing pipelines or time series individually or exploring across multiple tools. Seamless interaction ensures a smooth journey from start to finish, enabling multifaceted analysis of any problem.

The Future –Innovation & Vision

Continued Python Development

- Modularize all new tools for reuse and flexibility
- Ensure tools work independently or in concert
- Empower users to explore, understand, and communicate results

Unification of Tools Across Models

- Apply modular tool philosophy to both GPCM and G2M2
- Enable cross-model insights and scenario alignment

Scripting and AI Exploration

- Develop scripting tools for intuitive, command-driven interaction
- Research AI-driven capabilities for forecasting, diagnostics, and user guidance

Purpose Reaffirmed

Stay grounded in user needs:

- User-driven priorities, analyst empowerment
- Expand capabilities without sacrificing clarity or performance
- Deliver tools that help users analyze, explain, and influence decision making

We Want Your Input

- Your feedback helps us build the tools you need—better, faster, and more aligned with your goals.

Please follow this link to a survey with the information and questions or scan the QR code with your mobile device.
https://rbac.com/devsurvey/

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RBAC leads the market in global and regional gas and LNG market simulation and predictive analytics in support of corporate investment and M&A strategy, ESG, risk analysis, planning, and commodity trading. Our products and expertise help companies go beyond the narratives and hype to identify the opportunities and define the risks inherent in the uncertainties of energy transition using reality and fact-based fundamentals and analysis.

We continuously enhance our market simulation systems with the latest software and computer technology while applying the best of mathematical economics to assist our clients achieve their goals. This is especially needed as we see fundamental shifts taking place in the energy industry to achieve energy transition goals and meet increasingly demanding requirements of ESG. We provide regularly scheduled updates of our simulation systems and databases to keep our clients up-to-date with the most current market information. We enhance the functionality of our systems to enable our customers to simulate the effect of new regulations or industry requirements.

Our aim is to continue to lead the market in best practices which raise the standard of market simulation, enabling rapid and flexible scenario generation, sensitivity analysis, risk-assessment and forecasting, giving clients the edge in the rapidly changing energy market.

Those using RBAC's products and services include energy industry firms and consultants, as well as government agencies involved with energy, transportation, and the environment.

RBAC's principal products include:

- **GPCM® Market Simulator for North American Gas and LNG™** focused on the North American gas & LNG markets. GPCM is the industry standard market simulator for North American gas.
- **G2M2® Market Simulator for Global Gas and LNG™** for simulating increasingly integrated gas and LNG markets worldwide.
- **Gas4Power®** for integrating gas and power market fundamentals to produce credible forecasts for both.
- **NGL-NA®** Market Simulator for North American Natural Gas Liquids

With RBAC's advanced simulation systems, licensees can create and run scenarios involving bio-methane (Renewable Natural Gas – RNG) mixed with natural gas and to assess the implications of carbon taxes and markets on supply, demand, and prices. Future enhancements will include the ability to simulate the advent of a future hydrogen market with both pure hydrogen pipelines as well as mixtures with methane. The Energy Analyst of today and the future needs these kinds of tools to conduct realistic assessments and help develop realistic strategies and plans to achieve the goals of the energy transition.

Dr. Robert Brooks founded RBAC in 1987 based on experience developing several well-respected predictive models for government and industry. He designed the first gas transportation model while getting his PhD at MIT and has led the industry ever since.

RBAC's staff includes industry-trained experts in natural gas supply and demand, transportation, storage, marketing, and trading. Our team applies its world-class expertise in mathematical modeling, statistical analysis, mathematical algorithm development, software engineering, and database design to current and future challenges, risks and opportunities in energy.