# GENERAL ALGEBRAIC MODELING SYSTEM

High-Level Modeling

The General Algebraic Modeling System (GAMS) is a high-level modeling system for mathematical programming problems. GAMS is tailored for complex, large-scale modeling applications, and allows you to build large maintainable models that can be adapted quickly to new situations. Models are fully portable from one computer platform to another.

State-of-the-Art Solvers

GAMS incorporates all major commercial and academic state-of-the-art solution technologies for a broad range of problem types.
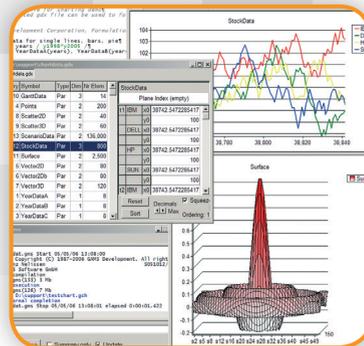
GAMS Integrated Developer Environment for editing, debugging, solving models, and viewing data.

Optimizing Carbon Capture Technologies: The CCSI Optimization Toolset

Carbon Capture technologies can significantly reduce atmospheric emissions of CO_2 from fossil fuel power plants. A widespread deployment of these technologies is necessary to significantly reduce greenhouse gas emissions and contribute to a clean energy portfolio. But the deployment is both expensive and time-consuming: bringing such technologies online can take industries between 20 and 30 years. Speeding up this process is the express goal of the Carbon Capture Simulation Initiative (CCSI). Founded by the U.S. Department of Energy in 2011, CCSI is a partnership among national laboratories, industry and academic institutions.

High-Level Modeling for the Success of Future Technologies

CCSI provides an optimization toolset that helps industry to rapidly assess and utilize these new technologies. The optimization tools identify optimal equipment configurations and operating conditions for potential CO_2 capture processes, thereby significantly reducing cost, time and risk involved in the implementation.

The CCSI research group has developed two advanced optimization capabilities as part of its Framework for Optimization and Quantification of Uncertainty and Surrogates (FOQUS) tool. Both utilize GAMS as an essential element. The first tool performs simultaneous process optimization and heat integration based on rigorous models. The heat integration subproblem is modeled in GAMS as LPs and MIPs and solved by CPLEX. The other tool optimizes the design and operation of a CO_2 capture system. The carbon capture system is represented as a MINLP model, which is implemented in GAMS and solved by DICOPT or BARON. GAMS is proud to be a part of this optimization toolset designed to make carbon capture a success.

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