

Major US Power Company Uses MATLAB® To Manage Assets and Set Trading Strategies

Mirant is a major energy producer and marketer, with operations in North and South America, the Caribbean, Asia, and Europe. Formerly Southern Energy, a subsidiary of Southern Company, Mirant became a fully independent company, traded on the New York Stock Exchange under the symbol "MIR," in April 2001.

In the United States, Mirant blends asset ownership—particularly power plants—with a state-of-the-art energy marketing and trading operation based in Atlanta, GA, the company's headquarters. This operation provides energy marketing, trading, and financial services to wholesale and industrial customers throughout North America.

To maintain the company's market position, asset managers need direct access to the right information—to the thousands of pieces of market data that allow them to determine the fair market value of assets that Mirant may buy or lease, and to run these assets profitably.

The group's research team provides this vital information in the form of mathematical models that have been tested and developed in MATLAB®.

THE CHALLENGE

"This is a research- and computation-intensive organization," explains Dr. Alexander Eydeland, vice president and head of research at Mirant, "and we build analytical models for just about everything we do. These are highly complex models because in addition to economic and financial considerations, they have to take into account engineering, environmental, legal, political, and other operational constraints."

Eydeland's research team consolidates vast amounts of information to build hundreds of models. The information includes hourly and daily power consumption; power outage data; power demand numbers; forward gas, oil, and coal prices; precipitation levels; long-range meteorological data; and historical information about power demand. As a result, says Eydeland, "The problems become massively complex, and we have to model that complexity."

THE CHALLENGE

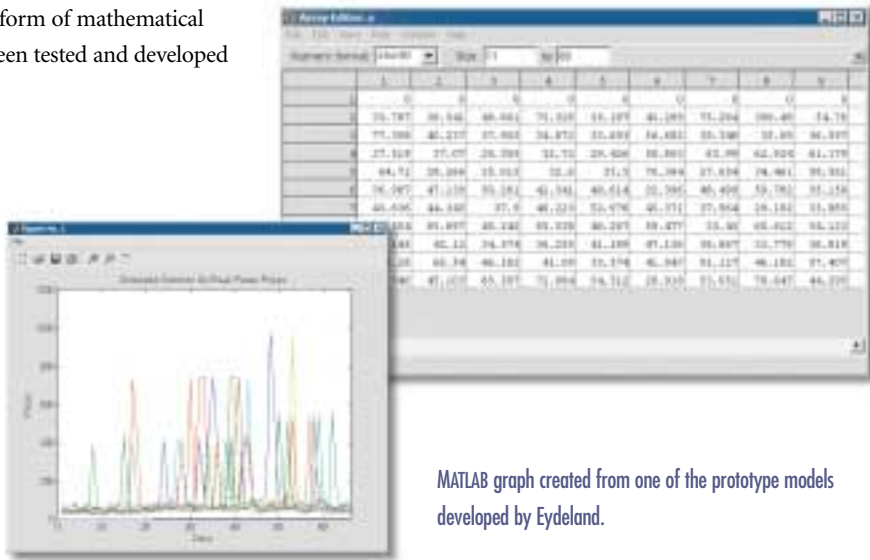
To develop models that provide timely information for managing energy assets and developing commodity trading strategies

THE SOLUTION

Use MATLAB to quickly develop, test, and deploy prototype models and strategies

THE RESULTS

- Programming time reduced by approximately 75%
- Detailed, complex models for managing energy assets
- Quick and easy development of new strategies for trading energy-related commodities





MATLAB is virtually the only program that can handle the large-scale problems that we model. It is a powerful tool that provides a very flexible environment in which to build models rapidly.



— Alexander Eydeland,
Mirant

THE SOLUTION

“MATLAB is ideally suited for this work,” Eydeland explains, “because we can implement an idea, connect it with a database, and check it, all in a couple of hours. If the idea works, we can deploy it, and if it doesn’t, we can throw it out.”

What Eydeland likes most about MATLAB is its ability to handle large, complex computations. “We solve very large-scale linear problems and use dense matrices,” he says. “MATLAB is the best tool from the point of view of large-scale numerical computations. It has a nice combination of flexibility, simplicity of use, and numerical efficiency, and the 2-D and 3-D graphics provide a strong visual impact.”

From a business standpoint, the greatest benefit is the time that MATLAB saves the company: “It’s very significant,” says Eydeland. “MATLAB can reduce programming time by about 75 percent.” If his staff attempted to create their models from scratch in C++, they could waste valuable time before discovering that they were going in the wrong direction: “In some cases it would be weeks before we could run the calculations.”

The Optimization Toolbox has also proved a time-saver, notes Eydeland, because it “provides a lot of useful routine functions that The MathWorks has already tested. That means we don’t have to take up a lot of time writing the algorithms ourselves.”

Since the aim of the modeling team is to cut development time, they must be able to quickly evaluate new methodologies for

solving problems and determining the validity of those solutions. “MATLAB lets us do that,” Eydeland says. “The key is MATLAB’s ease-of-use. We can put things together and debug them very quickly. The ease of assembling the program is impressive. We can produce reliable code quickly, and that’s very important.”

THE RESULTS

- **Programming time reduced by approximately 75%.** Creating models from scratch in C++ takes weeks. MATLAB lets Eydeland’s group test an idea in a few days.
- **Detailed, complex models for managing energy assets.** MATLAB can accept and work with large amounts of data, allowing Eydeland’s group to create models that give managers the detailed information they need to manage energy assets profitably.
- **Quick and easy development of strategies for trading energy-related commodities.** Whenever the company has a new idea for trading commodities, MATLAB lets Mirant quickly try out new strategies and either put them into action or reject them. ■

To find out more about Mirant, visit www.mirant.com

APPLICATION AREAS

- Finance
- Asset management
- Energy trading
- Application development

PRODUCTS USED

- MATLAB
- Optimization Toolbox

www.mathworks.com