

Product Description

@ENERGY/Power Generation is a real options-based decision support, asset optimization and valuation tool designed to manage and hedge power generation units and structured tolling transactions. Independent power producers, energy marketing firms, private-equity backed firms and other energy firms can accurately value and dynamically hedge their power generation exposures in order to fully realize the true value of their assets.

@ENERGY/Power Generation supports price-only models and user simulations, and is targeted to users with only power generation exposure.

What makes @ENERGY/Power Generation unique?

- Choice of multiple price models capable of realistic simulations with an hourly granularity.
- Flexible software environment for changing contract and modeling requirements.
- Accurate modeling of power plant operational costs, efficiencies and constraints.
- Cutting-edge Least Squares Monte Carlo (“LSMC”) methodology to value the power plant conditional on power prices, fuel prices and the plant operating characteristics, while honoring all forward market information.

Product Benefits

- Mark-to-market and quantify expected future profitability of power generation assets and structured tolling contracts
- Dynamically hedge power plant exposures through forward markets.
- Report operational metrics such as expected production, utilization rates and emissions.
- Assess the probability and nature of extreme dispatch scenarios.
- Derive the optimal dispatch schedule for any set of user specified power and fuel prices.
- Manage multiple assets or contracts in various regions and markets.

Key Features

Plant Specification.

@ENERGY/Power Generation takes into consideration the important generation plant characteristics:

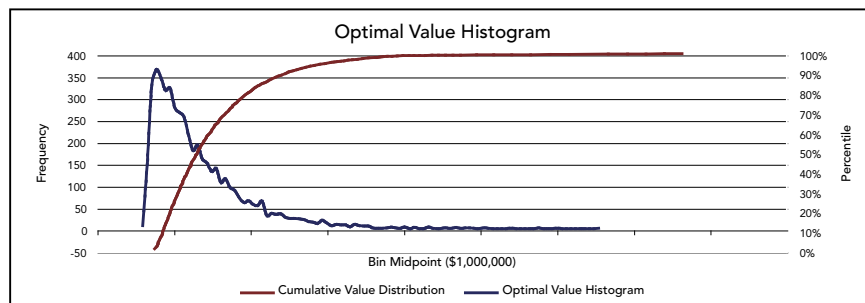
- Operational Efficiencies and Constraints – Heat rates, minimum generator on and off times, shutdown time, ramping times and startup times by user-defined hot, warm and cold starts.
- Costs — variable O&M, no load, emissions, shutdown and startup costs by user-defined hot, warm and cold starts. All costs can vary by date according to a user-defined schedule.
- Operation Schedule — start & end dates, initial & final generator states and dispatching frequency.
- Capacity Schedule — adjust for planned maintenance and seasonal variation in plant output.
- Forced outage — stochastic process that can generate both plant deratings and complete forced outages. Also supports external model of forced outages.

View aggregate risks and expected future profitability.

Power Generation allows users to observe the aggregate power and underlying fuel price risks for a power generation unit.

Power Generation also provides a graphical representation of the cumulative value distribution and optimal value histogram.

| Risk Measures | | | | |
|---------------|------|---------------|-------------------|-------|
| Power Deltas | 56 | On Peak (MW) | Power Unit Deltas | 0.37 |
| | 23 | Off Peak (MW) | | 0.15 |
| Fuel Delta | -210 | 10,000 MMBtu | Fuel Unit Delta | -1.40 |





Key Features (continued)

Multiple Price Process Models.

@ENERGY/Power Generation supports multiple price process models for power and fuel. Power prices can be modeled down to an hourly level, while retaining multiple risk factors, through the use of forward and option market data for different peak types and customized peak schedules that allow for user-defined periods and associated power price shapes.

The GenExp module supports:

- Two factor, lognormal mean reversion model. A pure stochastic model in which both spot prices and forward prices are jointly simulated. This model produces more accurate hedges than the single factor stochastic model, as daily and monthly option prices can be matched.
- One factor, lognormal mean reversion model. A pure stochastic model in which the spot price is modeled with one factor.
- External Model. Users can provide power and fuel price simulations generated by an external model.

LSMC Valuation Methodology.

@ENERGY/Power Generation incorporates recent advancements in derivatives pricing techniques by applying the Least Squares Monte Carlo ("LSMC") methodology to power plant valuation. LSMC is a simulation-based dynamic programming technique that allows the use of realistic price processes in the risk-management of power plant assets. LSMC is operationally similar to lattice models in that 1.) it does not implicitly assume perfect foresight and 2.) values are computed by rolling back through the simulated paths by creat-

ing decision rules using regression techniques. Application of LSMC allows @ENERGY/Power Generation to overcome many of the well-known difficulties in the realistic valuation of generation assets while maintaining speed advantages.

Detailed Valuation Results.

The list of @ENERGY/Power Generation output includes:

- Intrinsic value and optimal expected value with associated Monte Carlo standard error.
- Hedge statistics for fuel and both on-peak and off-peak power.
- Value statistics such as mean and standard deviation by multiple frequencies (i.e., hourly, daily, weekly and monthly) and on-peak/off-peak breakdown.
- Optimal value histogram, cumulative density function and utility analysis histograms.
- Cash flow from optimal operation and price trajectories.
- Economic dispatching rules.

Software Architecture

@ENERGY/Power Generation is a Microsoft Excel® Add-In that is written completely in C/C++ allowing for extremely fast calculations. It includes Excel Add-In functions (XLL files), customizable Excel templates, and documentation. When installed, @ENERGY/Power Generation XLLs add functions to Excel that are used like the built-in worksheet functions, allowing users to customize the included templates or create new ones. @ENERGY/Power Generation links to historical data using standard text file interfaces.

About FEA

Focusing on the energy, financial, and commodities markets since 1989, Financial Engineering Associates, Inc., an MSCI Barra company, is a leader in the development of financial derivatives valuation models and portfolio risk management software. Powered by innovation and excellent technical support, FEA has established leadership in developing a broad range of energy derivatives analytics and works closely with clients to adapt pricing models to changing market conditions. FEA leverages a network of selected system vendors and value-added distributors. FEA software systems are used by more than 250 institutional clients that include energy firms, money center banks, Fortune 500 companies, trading enterprises, and leading financial firms. For more information, please visit <http://www.fea.com>.

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