

## *Pricing, hedging, and risk management for weather derivatives.*

### **Product Description**

@ENERGY/Weather is a derivative pricing and risk management toolkit designed to evaluate weather derivative instruments. Energy, agricultural, and insurance companies use @ENERGY/Weather as an independent source of valuation information and as a critical tool for evaluating alternative hedge positions.

From forward temperature curve calibration, to weather derivative pricing, @ENERGY/Weather includes all the functionality required to price and hedge weather derivative positions. Typical users include traders, risk managers, gas and power marketers, utilities, industrial firms, brokers, and auditors. As with all FEA software, it's fully documented, rigorously tested, and highly optimized. @ENERGY/Weather is one of the modules of the @ENERGY suite.

### **Product Benefits**

**Extensive Instrument Coverage** — @ENERGY/Weather's functions and templates value both standard and specialized weather derivative trades such as capped payouts, collars, knock-in and knock-out barrier options, digital options and swaps. The supported set of instruments (see Coverage) can be extended by combining and chaining functions to value complex transactions. FEA regularly expands instrument coverage and publishes new spreadsheet templates.

**Historical Analysis and Monte Carlo Pricing Models** — Weather instruments are valued using both historical analysis (Burn Analysis) and Monte Carlo simulation pricing models. Historical analysis uses past temperature data from specified months to generate a set of historical payoffs. The Monte Carlo method values the instrument by simulating daily temperatures, computing a composite of simulated payoffs, and then analyzing its statistical properties. Users can benchmark the results of one methodology versus the other.

**Flexible Inputs.** With @ENERGY/Weather users can:

- Choose either Heating Degree Days, Cooling Degree Days, Energy Degree Days, or Growing Degree Days as the options underlying
- Specify a maximum payout for capped calls and puts
- Set the base temperature for measuring degree days
- Value customized collars and swaps with variable reset weights and call/put combinations
- Derive model parameters from historical temperature data

**Comprehensive Results.** All scalar price and risk measures can be calculated with a single function call. Results include price, delta, gamma, vega, theta, and rho. Output includes histograms for comprehensive analysis of simulated and historical temperatures and payoffs. The calibration function returns full temperature and volatility curves.

**Calibration.** @ENERGY/Weather calculates the mean reversion time, annual temperature drift, temperature curve and volatility curve based on analysis of historical data.



## Coverage

Supported instruments and functions include:

- Calls/Puts with Payout Caps
- Swaps
- Collars
- Barriers
- Digitals
- Model Calibration.

## Software Architecture

@ENERGY is a Microsoft Excel® Add-In that is written completely in C/C++ providing for extremely fast calculations. It includes Excel Add-In functions (XLL files), customizable Excel templates, and documentation. When installed, @ENERGY 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 is also available as the ErgLib C library for Unix and Windows programmers who want to incorporate @ENERGY functions into custom and third-party C, C++, Visual Basic, and SQL database applications.

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## 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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## For More Information

Please contact your local FEA office, or visit us online at [www.fea.com](http://www.fea.com)

### BERKELEY

2100 Milvia Street  
Berkeley, CA 94704-1113 USA

tel +1.510.548.6200  
fax +1.510.548.8798

### NEW YORK

Wall Street Plaza, 88 Pine St, 2nd Floor  
New York, NY, 10005 USA

tel +1.212.804.3900

### LONDON

75 King William Street  
London, EC4N 7BE, United Kingdom

tel +44.(0).20.7618.2101

### HOUSTON

Williams Tower, 2800 Post Oak Blvd, 46th Floor  
Houston, Texas 77056 USA

tel +1.713.438.4688  
fax +1.713.438.4687