



# Energy Trading

## Information Kit

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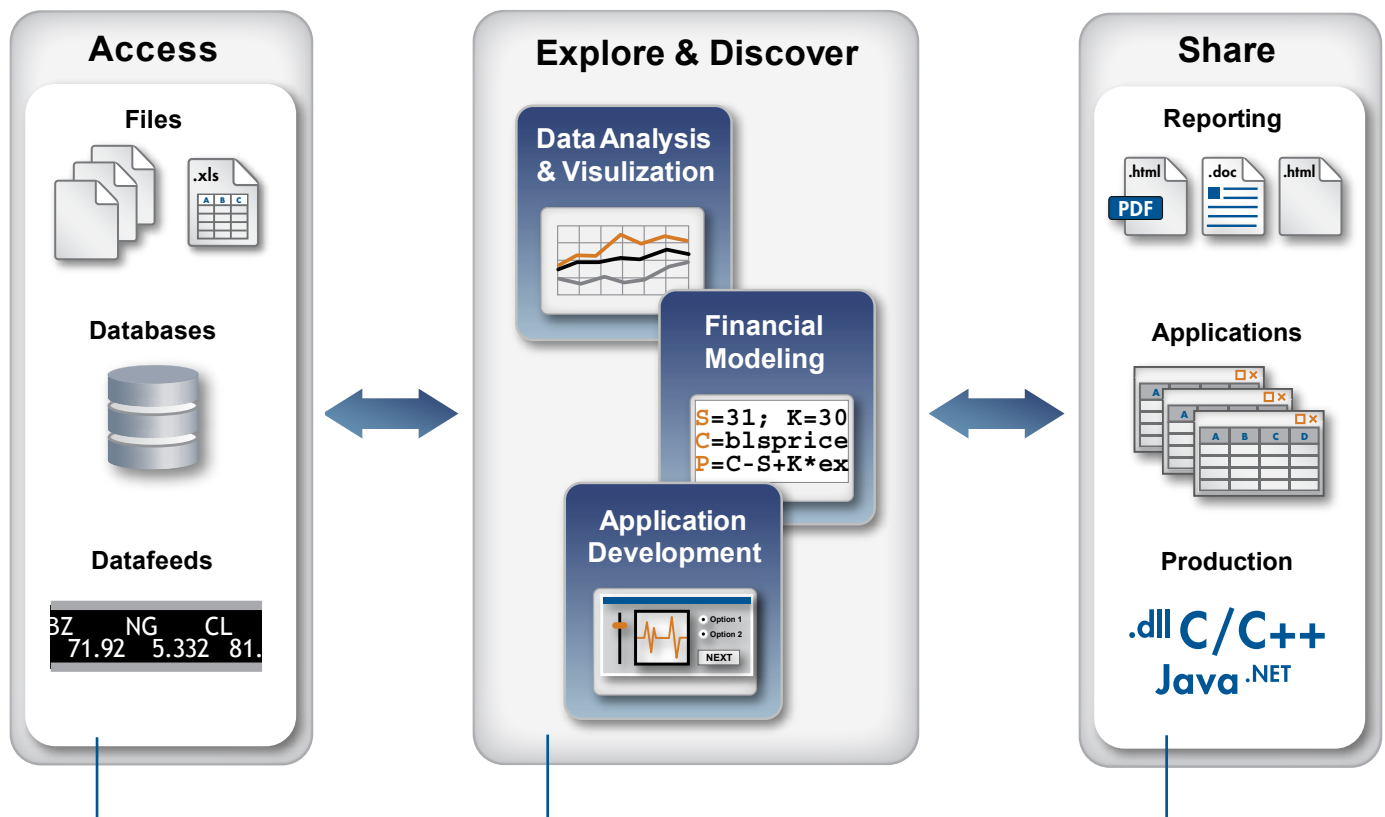
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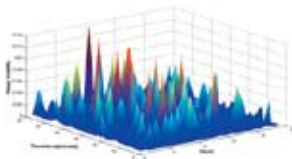
## Workflow for Technical Computing

Using MathWorks tools, analysts respond to changing demands and operational constraints by developing and adapting models that manage energy assets and build commodity trading strategies. From within the MATLAB environment, they can:

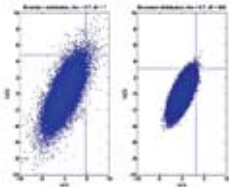
- Import energy data from multiple sources
- Model and analyze data, including time-series data
- Price and value assets, options, and derivatives
- Estimate and model risk
- Deploy algorithms into enterprise architectures



### User Stories



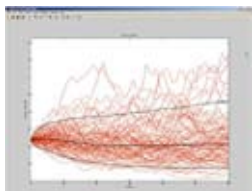
- CalPERS Analyzes Currency Market Dynamics to Identify Intraday Trading Opportunities



- Capgemini Helps Clients Achieve Basel II Compliance and Deliver Economic Capital, Risk, and Valuation Models with MATLAB



- Horizon Wind Energy Develops Revenue Forecasting and Risk Analysis Tools for Wind Farms



- Robeco Develops Quantitative Stock Selection and Portfolio Optimization Models with MathWorks Tools



- UNION FENOSA Predicts Energy Supply and Demand Using MathWorks Tools

## Technical Articles

- **Developing Portfolio Optimization Models**

Financial data analysis and modeling tools, such as MATLAB and Financial Toolbox, can be used to overcome practical and theoretical problems involved with portfolio optimization.

- **Developing and Implementing Scenario Analysis Models to Measure Operational Risk at Intesa Sanpaolo**

New scenario analysis models enable Italy's leading bank to comply with Basel II requirements by holding capital against losses arising from operational risk.

## On-Demand Webinars

### ▪ Using MATLAB to Develop Asset Pricing Models

Learn how to develop and evaluate asset pricing models. MathWorks engineers will show how you can construct asset pricing models, perform multivariate regression and handle missing data, calibrate asset pricing models using seemingly-unrelated regression (SUR), implement the Fama and French three-factor model with IPO data to uncover persistent alphas, and perform statistical tests to validate the significance of short-term pricing anomalies.

### ▪ Basket Index Pricing (Structured Products) Using MATLAB

Learn how to use MathWorks financial services tools to price structured products such as a basket of indices. MathWorks engineers will demonstrate the use of MATLAB for all phases of data analysis, from data acquisition to visualization; programming and algorithm development; and application development and deployment.

### ▪ Using MATLAB to Develop Portfolio Optimization Models

Learn how you can use MATLAB for asset pricing, risk measurement, and portfolio optimization. MathWorks engineers will demonstrate methods for developing tradable portfolios of assets that have low turnover, stable moments, and desirable return and risk characteristics.

### ▪ Parallel Computing with MATLAB in Computational Finance

Learn how to use MathWorks parallel computing products to perform more comprehensive financial analysis and work with larger data sets. MathWorks engineers will demonstrate how you can speed up and increase the scope of your MATLAB applications using high-performance resources including multicore desktops, clusters, and grids.

### ▪ Using MATLAB to Develop and Deploy Financial Models

Learn why finance professionals worldwide use MATLAB and other MathWorks tools to rapidly develop financial models and freely deploy customized algorithms to decision makers such as investment managers, actuaries, and traders. MathWorks engineers will demonstrate how MATLAB can help you significantly reduce the time it takes to develop your own models.

## Demo Videos

- **Introduction to Econometrics Toolbox™**

Model economic data for simulation and forecasting. Topics covered include univariate ARMAX/GARCH models, multivariate VARMAX models, and Monte Carlo methods for linear and nonlinear stochastic differential equations.

- **Processing Large Data Sets with Data-Parallel Applications**

Work interactively with large data sets by distributing them across multiple computers.

- **Deploying Applications with MATLAB**

Share and deploy MATLAB applications with other users. Topics covered include creating standalone executables and generating C, C++, Java, .NET, and Excel components.

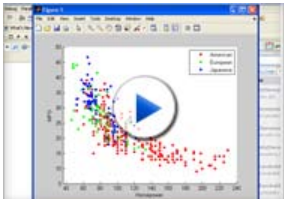
## Key Products



### ▪ MATLAB

*The Language of Technical Computing*

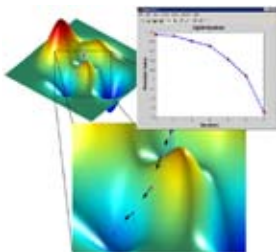
MATLAB<sup>®</sup> is a high-level language and interactive environment that enables you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and Fortran.



### ▪ Statistics Toolbox

*Perform statistical analysis, modeling, and algorithm development*

Statistics Toolbox<sup>™</sup> provides a comprehensive set of tools to assess and understand data. Statistics Toolbox includes functions and interactive tools for modeling data, analyzing historical trends, simulating systems, developing statistical algorithms, and learning and teaching statistics.

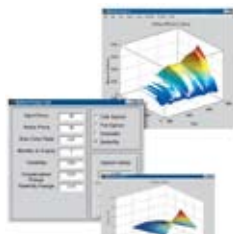


### ▪ Optimization Toolbox

*Solve standard and large-scale optimization problems*

Optimization Toolbox<sup>™</sup> provides widely used algorithms for standard and large-scale optimization. These algorithms solve constrained and unconstrained continuous and discrete problems. The toolbox includes functions for linear programming, quadratic programming, binary integer programming, nonlinear optimization, nonlinear least squares, systems of nonlinear equations, and multiobjective optimization. You can use them to find optimal solutions, perform tradeoff analyses, balance multiple design alternatives, and incorporate optimization methods into algorithms and models.

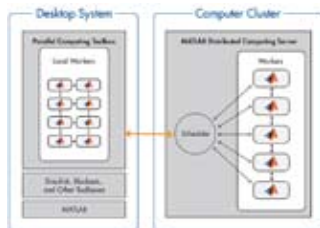
## Key Products



### Financial Toolbox

*Analyze financial data and develop financial algorithms*

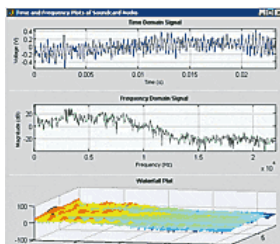
Financial Toolbox™ extends MATLAB, Statistics Toolbox, and Optimization Toolbox with functions for mathematical and statistical analysis of financial data. Using Financial Toolbox you can optimize portfolios, estimate risk, analyze interest rate levels, price equity derivatives, and handle financial time series.



### Parallel Computing Toolbox

*Perform parallel computations on multicore computers and computer clusters*

Parallel Computing Toolbox™ lets you solve computationally and data-intensive problems using MATLAB and Simulink® on multicore and multiprocessor computers. Parallel processing constructs such as parallel for-loops and code blocks, distributed arrays, parallel numerical algorithms, and message-passing functions let you implement task- and data-parallel algorithms in MATLAB at a high level without programming for specific hardware and network architectures. As a result, converting serial MATLAB applications to parallel MATLAB applications requires few code modifications and no programming in a low-level language. You can run your applications interactively or offline, in batch environments.



### MATLAB Compiler

*Build standalone executables and software components from MATLAB code*

MATLAB Compiler™ lets you share your MATLAB application as an executable or a shared library. Executables and libraries created with the MATLAB Compiler product use a runtime engine called the MATLAB Compiler Runtime (MCR). The MCR is provided with MATLAB Compiler for distribution with your application and can be deployed royalty-free.

### Additional Energy Segments

Engineers and scientists worldwide rely on MathWorks software to perform the challenging analysis, simulation, and product development tasks necessary to address the world's energy needs. You can use MATLAB and Simulink to evaluate energy resources, develop systems for power generation and distribution, model energy markets, and create products that consume less energy and are environmentally friendly.

**Electric Vehicles**

**Electric Utilities**

**Solar Power**

**Oil and Gas**

**Wind Power**

**Trading and Risk**