

KySIM: Monte Carlo price simulations

KySim is the main Monte Carlo simulation engine in the KYOS Analytical Platform. It allows traders and risk managers to generate a large number of realistic price scenarios, which can be used directly for valuation and risk management. KySim relies on a hybrid approach of statistics and fundamentals. It contains a mix of best-practice methodologies to capture specific dynamics in energy and commodity markets.

- ✓ Generate very realistic scenarios of forward and spot prices
- ✓ Enjoy user-friendly interface and fast calculations
- ✓ Apply best-in-class mathematical methods
- ✓ Benefit from cointegration to obtain realistic spreads

KySim helps to fully capture the option value which is embedded in energy assets and contracts. With KySim, valuation is more accurate, market hedges are more effective and risks metrics are more reliable.

Benefits

Apply cointegration for realistic commodity spreads

KySim has been developed for simulating multi-commodity spreads: spark spreads, dark spreads and any other commodity spread.

The combination of correlation and cointegration ensures both price returns and price levels remain at fundamentally correct levels.

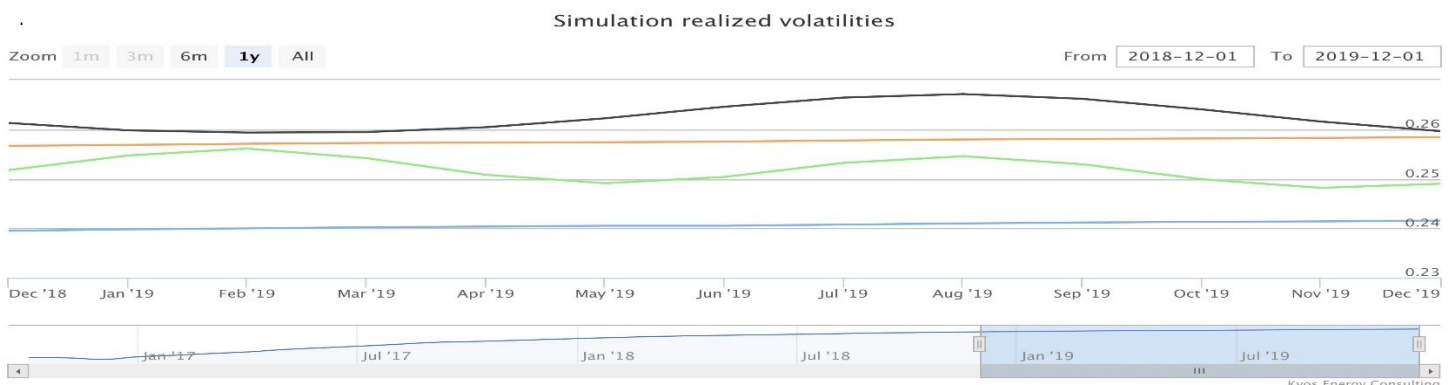
How can I validate my model assumptions?

KySim calculates statistical inputs based on historical time series. An intuitive multi-factor model has been implemented with long-term, short term and seasonal factors. The inputs can be compared with and overwritten by implied volatilities, derived from option prices.

Price simulations are accessible to the user per price path, giving full transparency over the outputs and the possibility to assess the quality of individual scenarios.

Include fundamental elements of power markets

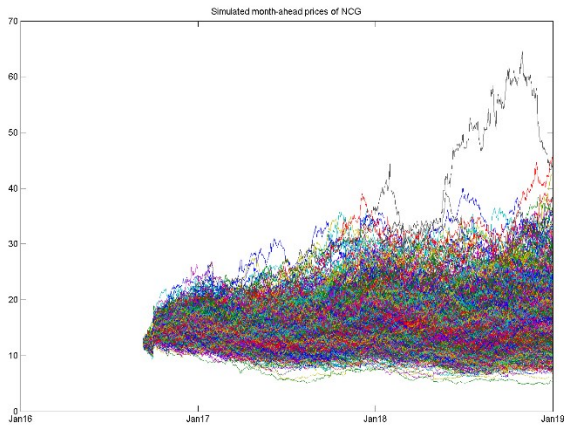
Power markets contain specific structures which do not fit in a pure statistical approach. Power prices are determined by the movement of gas, coal and CO² prices. Via a country specific merit order power prices remain connected to the underlying commodities. On top, the impact of the Carbon Floor on the power price can be specified explicitly. The combination of sound statistics with fundamental elements leads to realistic power price scenarios, needed to correctly value power assets.



Features

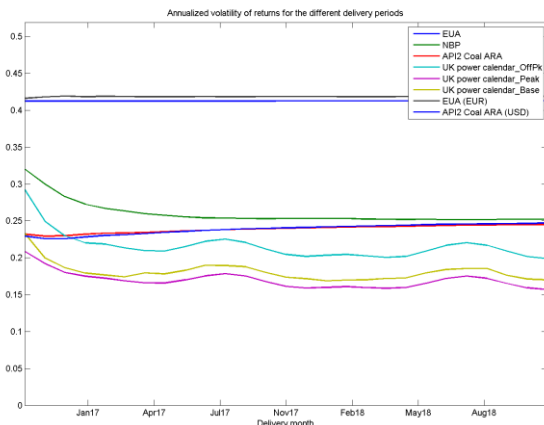
KySim contains advanced methodologies for simulating commodity prices. Volatilities can be calculated, or entered based on option prices.

KySim is fully embedded in the KYOS Analytical Platform. Automated data feeds ensure you have up-to-date price simulations available, ready to be used in energy asset optimization, hedge optimization, valuation or risk calculations.



Methodology

KySim has been developed with the best statistical methods. This includes time-varying volatility, correlations, cointegration, mean-reversion, jumps and regime-switches. Market price parameters are calibrated on historical data. KySim is uniquely dedicated to energy price dynamics, away from pure financial market models, e.g. using cointegration and a fundamental methodology for power prices, spark and dark spreads.



KYOS Analytical Platform

KyCurve is fully embedded in the KYOS Analytical Platform to create detailed hourly price forward curves for power, gas and other commodities.

All KYOS Analytical models are developed in Matlab, and part of the KYOS Analytical Platform. Other software modules include:

- **KyPlant:** determine the value of a (portfolio of) power plants by quickly calculating the optimal dispatch,
- **KyStore:** optimize a gas storage and calculate values, delta positions and day-ahead trades
- **KySwing:** helps to generate most income from gas contracts by optimizing the contract flexibility
- **KySim:** generate Monte Carlo price simulations, relying on a hybrid approach of statistics and fundamentals
- **KyPF:** generate hourly price forecasts and simulations for one or more power markets.
- **AtRisk:** calculate both Cashflow and Earnings-at-Risk. Both metrics show the distribution of future results over longer horizons.

The KYOS Analytical Platform is developed in PHP. A MySQL or MS SQL database is used for data storage. Compiled Matlab models perform the analytical calculations.

Technical information

The Platform can run on a Windows and on a Linux environment. The platform is delivered by default as cloud solution, and it can also be installed on a local server.

The Platform can operate as a stand-alone software application. Automated price connections are possible and recommended. Connections to other systems for contract data and calculation results can be developed based on customer specifications and the XML protocol.

An installation on a local or cloud server is typically performed in one working day.