

# E=mc<sup>2</sup>

...Energy has not created a new problem; it has merely made more urgent the necessity of solving an existing one.

- Albert Einstein

## Energy SPA



Sophisticated Predictive Analytics for Energy Industry

### How We Can Help?

1. User-customizable tail-risk scenarios, assembled by a recognized market research team synthesizing consensus views from published economic and market research
2. Ability to estimate whether an energy player has defensible profit margins relative to weighted average cost of capital (WACC) or an energy index, at statistical confidence as high as 99.93%
3. Combine upside forward-looking economic with low-probability "black swan" scenarios, and rebalance assets and outputs for optimal performance
4. Reduce drawdowns on holding of assets by as much as 75% ahead of global market storms
5. Break down forward-looking scenarios into breakeven or required return for each asset or each asset class, as one way to document and monitor the reasonableness of any investment or business decision
6. Model and include illiquid investments (e.g. oil fields) in any multi-asset, multi-frequency portfolio
7. Monitor and adjust temporary market exposures with (fundamental or statistical) factors and hedging tools until the next rebalancing cycle

### Who Are We?

EnergySPA is a cloud-based predictive analytics platform that protects the Energy Industry against severe losses on its assets, makes reallocation and reinvestment decisions under reasonable market scenarios and helps identify winning strategies in recovering markets.

### How We Differentiate?

- Energy markets are known for tail risk behavior (i.e. once-in-a-decade crashes more frequent than predicted by the normal distribution) with highly 'non-normal' underlying key market factors.
- Typical platforms use Monte Carlo simulations to capture the non-linearity of complex instruments that are meant for non-energy markets, and add very limited values to the Energy Industry.
- Monte Carlo simulations rely on the Cholesky decomposition of variance-covariance matrix of key market factors; however, the resulting simulations produce normal markets because non-normality is not captured by the inputs (i.e. the variance-covariance matrix).
- The best 'fat tail' simulation technology available today can calibrate to a variance-gamma distribution with pre-defined uniform fat tail distributions, which may be helpful to price options in a small sub-segments of the energy market (e.g. distillates), but will not work well for modelling the overall energy markets where crashes are driven by 'messy', non-uniform fat-tail behavior.
- Net Result: Other platforms may produce predictions 'off' by as much as an order of magnitude!

### Where We Stand in the Playing Field?

#### EnergySPA

- Readily defined energy assets (e.g. refinery)
- Native support for multi-asset, multi-frequency assets
- Tail risk models supported by architecture
- Energy-only principal components, which is an industry first
- Ready-for-deployment tail risk scenarios
- Virtualized deployment with flexible integration in stages
- Algorithms with real-time performance and practitioner-tested parameters and heuristics
- Software-as-a-Service advantage with much lower maintenance

#### Competitors

- Likely supported by a team lacking real-world energy experience and expertise
- Either make up data or worse delete useful data to enforce uniform data frequency
- At best retrofit tail risk model into legacy architectures
- Factors are driven with by and fixed income
- Tail-risk scenarios only an 'after-thought'?
- On-site deployment only, hard to show benefits before massive integration
- Overnight batch jobs, rigid parameters
- Require high-maintenance support from headcount-heavy technology teams

As Featured By:  
[venturescanner.com](http://venturescanner.com)

As Mentioned By:  
**Forbes**



# Step by Step Guide

## 1. Define the year-ahead market scenarios:

- User-customizable scenarios based on consensus research compiled by our recognized research team, providing detailed justifications

Type	Index	Current	New	Change	Change %
Equity	S&P 500 Index	1917.83	1821.94	-95.89	-5.00
	SS Financial	290.55	290.55	0	0.00%
	SS Health Care	761.76	761.76	0	0.00%
	SS Consumer	519.91	519.91	0	0.00%
	SS Industrials	446.80	446.8	0	0.00%
	SS Telecom Serv	162.34	162.34	0	0.00%
Bond	Ishare International Treasury Bt	93.920	92.042	-1.878	-2.00
Forex	-NONE-	0.0000	0	0	0.00
Commodity	Gold	1228.23	1105.41	-122.82	-10.00

- Mix of 'Oil Price Up' and 'Oil Price Down' Scenarios
- Users do not need to be experts in every market and region outside energy
- Assign confidence to each scenario for further analysis

Oil Price Up Scenarios	Oil Price Down Scenarios
Stronger economy demands more oil Weaker USD and detaching from world oil trade	Slower global economy slows down consumption USD strengthens due to competitive devaluation by everyone else
Fewer oil inventories	Pent-up inventories finally need to be released to global market when storage runs out
Less oil supply or more output drop Colder winter weather	More oil supply, Iran outputs picking up Unseasonably warm winters
Natural disasters on oilfield production Less oil reserves in stock or discovered ETFs more interests in oil stocks	Desperate producers keep pumping to make up for lost revenues Bankrupted US shale producers liquidating at fire-sale prices General redemptions on commodity ETFs
Geopolitical conflicts or at war in Middle East	Middle East manages to reach a temporary truce
OPEC and non-OPEC reach agreement to tune oil market	No agreement between OPEC and Russia
Producers demanding use of GCC common currency to purchase crude oil	Producers sees no win if they stop recycling petrodollars

## 2. Calculate and verify that assets can breakeven on cost of capital

- Long assets, short benchmark, at predefined statistical confidence such as 99.93%
- For planning purposes, find the oil price scenarios your assets will start making a loss under a predefined statistical confidence

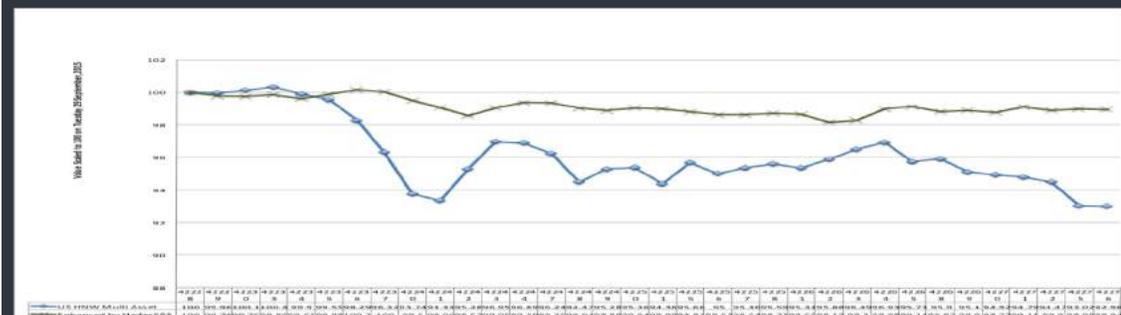
Category	User Settings	
Portfolio Preferences	Name *	Value
User Preferences	Confidence Interval (%)	99.93
Basic	Risk Free Rate (%)	2

## 3. Combine upside forward-looking economic with low-probability "black swan" scenarios, and rebalance asset weights to optimize betting ratios, e.g.

- 60% US Economic Recovery
- 10% each for 'black swan' scenarios

Factor	Middle East Improves	Middle East Deteriorates	Oil Prices Tank	Oil Prices Recover	US Economic Recovery
<b>Confidence Level (%)</b>	10	10	10	10	<b>60</b>
iShares MSCI AC World Index Fund	6	-10			
SPDR Barclays International Treasur...	2	-3			
DXY		-10	3	-5	
S&P 500 Index			-10	10	8
CBOE Interest Rate 10-Year T-Note			0	0	4.5
Brent Crude			-15	20	

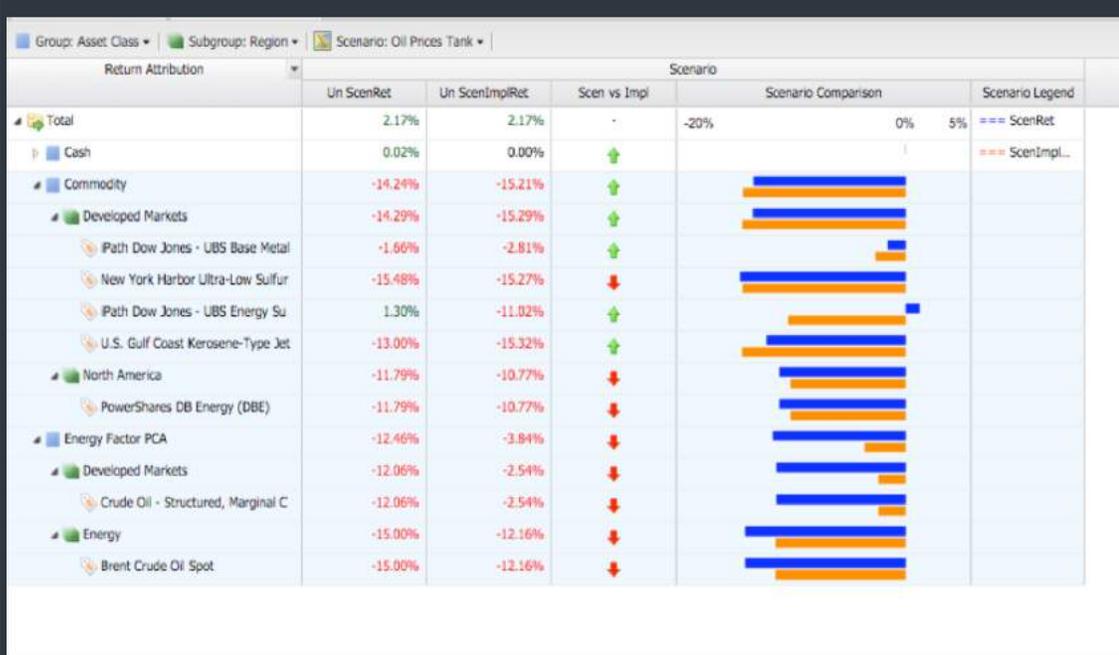
## 4. Reduce 'peak to trough' drawdowns on assets by as much as 75%



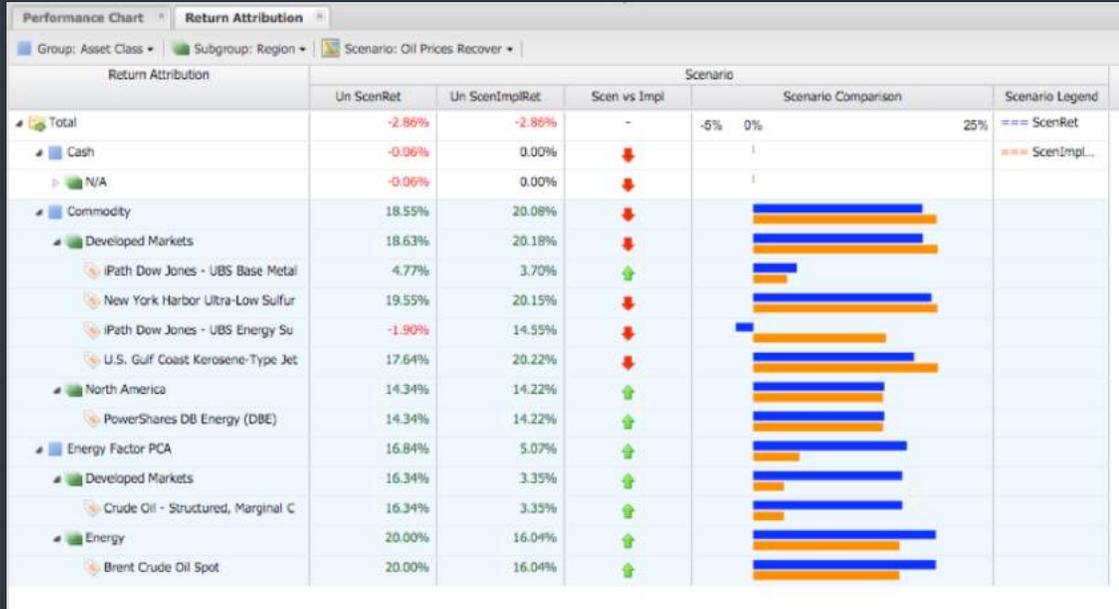
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5. Analyze breakeven returns by asset or asset classes:

- Scenario 1: Oil Price Tanks
- Recommendations: Sell more distillates forward, Reduce production



- Scenario 2: Oil Price Recovers
- Recommendations: Increase production and storage, Delay selling distillates



6. Model low-frequency illiquid energy assets

- Oil fields at marginal cost of production at \$40 and \$50 as examples
- Summarize them by using an Energy-only Principal Components model, which is an industry first

Product Name	System Factor Universe	EPCA1	EPCA2	EPCA3	EPCA4	EPCA5
Brent Crude Oil Spot	Energy PCA	-42.69	-21.24	-139.20	4.17	-12.51
Crude Oil - Structured, Marginal Cost of Production=\$40	Energy PCA	60.35	1.87	38.94	8.37	-4.53
Crude Oil - Structured, Marginal Cost of Production=\$50	Energy PCA	52.22	1.61	32.82	5.41	-5.80
<b>User</b>		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>System</b>		<b>69.88</b>	<b>-17.76</b>	<b>-67.44</b>	<b>17.95</b>	<b>-22.84</b>
<b>Portfolio</b>		<b>69.88</b>	<b>-17.76</b>	<b>-67.44</b>	<b>17.95</b>	<b>-22.84</b>

7. Monitor and adjust temporary market exposures with advanced hedging tools until the next rebalancing cycle

- Entirely flexible choices of calendar and product spreads
- Practitioner-proven, award-nominated hedging algorithms

Product	Asset Class	Contract	Position	Weight
Brent Crude Oil, 1st Nearby Futures Contract	Commodity	920775.61	44,427,423	26%
Brent Crude Oil, 2nd Nearby Futures Contract	Commodity	547826.24	26,810,616	15.69%
Brent Crude Oil, 3rd Nearby Futures Contract	Commodity	-777215.33	-38604285	-22.59%
Brent Crude Oil, 4th Nearby Futures Contract	Commodity	-1343117.19	-67518501	-39.51%

Portfolio	Historical Return	Volatility	VaR	cVaR	MaxDD	Beta	SR	ASR	Skewness	Kurtosis	Treynor Ratio	Jensen's Measure	Semi-Deviation
Actual Portfolio	40.75%	39.21%	54.57%	69.10%	19.50%	0.01	0.9884	3.6711	0.72	4.87	-2.9554	0.3731	33.69%
Hypothetical Portfolio	48.20%	38.74%	52.42%	66.05%	17.80%	-0.09	1.1926	4.0473	0.83	5.15	-2.1981	0.4388	32.82%