

## Risk Management Solutions for Oil Refineries

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CompuHedge Ltd. provides various strategic Risk Management solutions for corporations in the areas of currency, interest rates, commodities and energy market risks. CompuHedge experts in Risk Management Software provide an exceptional opportunity for companies looking for a complete solution for their hedging needs.

- Accounting and regulatory consultancy targeted at the senior executive level, and its computerized integration by the operational level.
- Software is continually updated to include new accounting methods and regulations.
- Customized computerized tools to quantitatively assess the performance of the Chief Risk Officer (CRO)

This document focuses on the challenges that Energy Sector corporations face. In particular, they have to deal with extremely complex energy risk scenarios. CompuHedge provides a solution that allows for the modeling of these scenarios and thus allowing Senior Management to define and control policy objectives.

### The Challenges

Companies that trade in crude oil (or its derivatives) or even merely consume petroleum products are exposed to market risks during the time the oil is being held in storage. These market risks include both the physical market and the futures market. Refineries are doubly vulnerable; they are exposed both to fluctuations in the price of Crude and to fluctuations in the price of its derivatives, resulting in uncertainty in the "refining margin", the core business of the oil refineries.

When companies protect themselves by doing hedging activities, the difficulty in performing Exposure analysis is even more challenging. The challenges in Refineries are further compounded by the fact that the hedging itself creates new synthetic exposures, which also need to be dealt with.

The intricacies of the hedging processes, coupled with the unavailability of appropriate tools, means that exposure analysis involves complex calculations. Examples include:

1. Partial hedging of a certain component creates new marginal exposures.
2. Involvement of conversion coefficients.
3. Changing portfolio.
4. Time differences.

A company lacking the ability to identify exposure and treat it in real time might choose to adopt a "head-in-the-sand" approach. However even if they do try and conscientiously identify their exposure, a lack of the appropriate tools (that cover all the risks) will render them continuously – and negatively – surprised.

In contrast with other types of exposure in the financial markets (e.g. Currencies, Interest Rates, and Metals) – which do not necessarily require individual adjustment for each company – the need for customization for companies in the Energy sector is crucial.

The main strategic goals for companies in the Energy sector are as follows:

1. Identification of Risk, including the ability to measure it by running different Risk Scenarios – for different levels of Hedging – which will help the company determine its Hedging and Trading policies.
2. Formulation of a measurable policy, including defining maximum acceptable risk.
3. Modeling and transaction-monitoring; these are both pre-requisites for Hedge Accounting.
4. Ability to manage and control all of the above from a central (online) interface.

Identification and estimation of exposure is particularly difficult in the Oil and Petro-chemical industry. Even if hedging is not performed, the risks are varied and include:

1. The differences in timing between buying and selling.
2. Exposure to a number of diversified products (and not just to the price of Crude)
3. Impact on the company's balance sheet in the event of a decrease in the value of the company stockpile.
4. Impact on the company's quarterly results and on the company's value, due to changes in the Refinery Margins.

If hedging is performed, then the company faces another set of risks in addition to the general market risks, including:

1. The difference between the future oil contracts to the actual crude oil price.
2. Risk of fluctuation of the time curve for the forward contracts.
3. Risk which stems directly from the difference between products traded in the physical market and between future contracts used for Hedging.
4. Risk which stems directly from the physical location (e.g. West Texas, North Sea, East Asia, Mediterranean sea etc.)
5. Risk which stems from changes in the Exchange rate (if the local currency is not in USD)
6. Correlations between the various products and the raw materials.

It is very difficult to build an overall picture of the Risk involved, due to the many components (as described above).

## The CompuHedge solution

CompuHedge offer a software solution, tailored to your specific needs. (See the next page for screenshots of the solution that we implemented with an existing client.) The solution we offer includes:

### For the management:

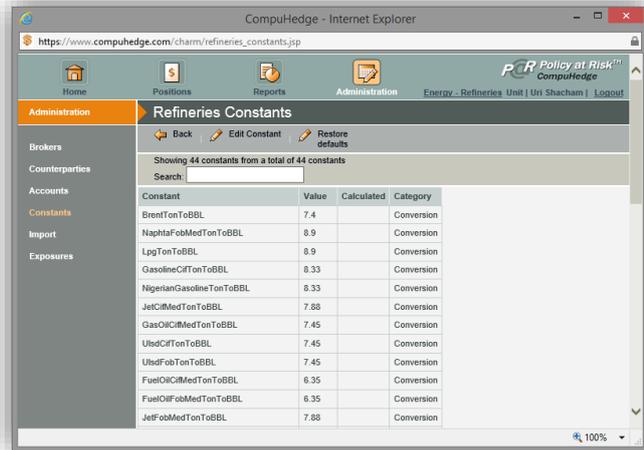
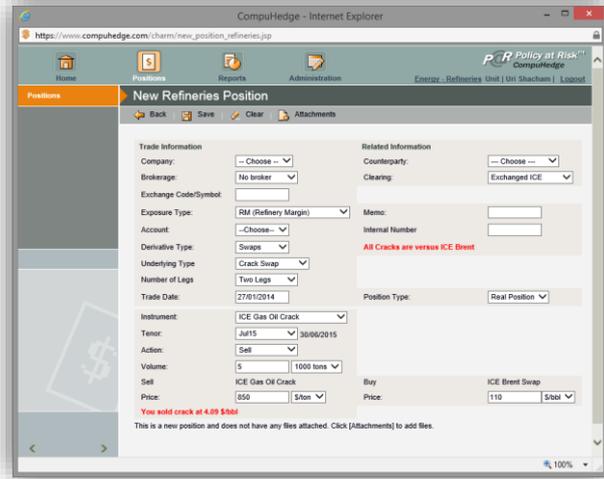
1. Exposure and combined exposure and hedging instrument scenarios for extreme and VaR situations with different hedging strategies to present to the management in order to adopt hedging policy.
2. This unit is tailored (via advisory process) to the specific need of each refinery.
3. Policy and Compliance units tailored to each refinery.
4. Advisory services re regulation and hedge accounting policy.

### For operational use

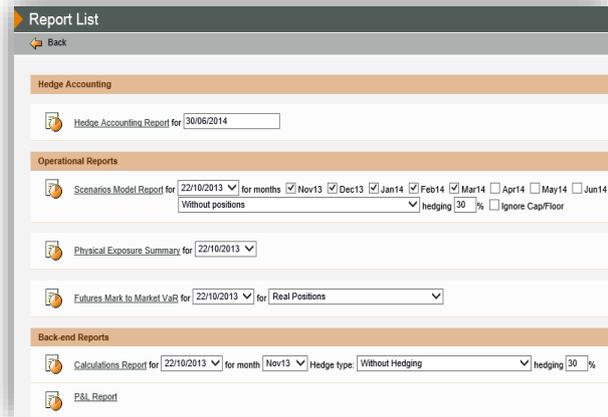
- Front, Middle and Back-office platform:
  1. A web interface to enter future trades
  2. Back office and documentation.
  3. Interface to Platts (on Reuters) future prices
  4. Front and back office P&L reports.
  5. Scenario unit to test possible trades and existing portfolio in line with company policy.
  6. Hedge accounting process, documentation and auditor report tailored to the special needs of refineries.

## The CompuHedge solution as applied to Refineries

Some screenshots from a solution that was developed for one of our clients.



DFL	Calendar Spread	Refinery Margins
2,300,000 barrels	2,950 contracts	25,200 tons
550,000	1,400	10,000
550,000	1,100	15,200
100,000	300	0 (F)
100,000	300	0 (F)
100,000	200	0 (F)
100,000	150	0 (F)
100,000	150	0 (F)
100,000	150	0 (F)
100,000	100	0 (F)



Memo	Internal Number	Status	Asset	Period	Total Amount	Unit	Entry Price per barrel	Market price per barrel (\$)	MtM (\$)	Exit Date	Exit Price per barrel	P&L (\$)
		Closed	Future Spread	Apr14	150,000	Barrels	0.3220			NA	0.0200	-45,300
		Closed	Future Spread	Feb14	150,000	Barrels	0.2925			NA	0.6000	46,125
		Closed	Future Spread	May14	100,000	Barrels	0.2744			NA	0.6200	34,564
		Closed	Future Spread	Mar14	100,000	Barrels	0.3200			NA	0.5300	21,000
		Closed	Future Spread	Jan14	150,000	Barrels	0.2675			NA	0.5100	36,375
		Closed	Future Spread	Jun14	100,000	Barrels	0.3375			NA	0.6900	35,255
		Closed	Future Spread	Oct14	100,000	Barrels	-0.0323			NA	-0.4600	-42,769
		Closed	Future Spread	Sep14	100,000	Barrels	-0.0035			NA	-0.6749	-67,143
		Closed	Future Spread	Aug14	100,000	Barrels	-0.0837			NA	-0.6900	-59,625
										<b>TOTAL:</b>		<b>-41,519</b>
		Open	Future Spread	Nov14	200,000	Barrels	0.0182	-0.4500	-93,643			
		Open	Future Spread	Dec14	200,000	Barrels	-0.0091	-0.4800	-94,184			
		Open	Future Spread	Mar15	200,000	Barrels	-0.3700	-0.3300	8,000			
		Open	Future Spread	Apr15	150,000	Barrels	-0.3100	-0.2800	4,500			

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