

**The influence of Libya
on Swiss refineries and their potential futures**



Petroplus



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Déclaration

Ce travail de Bachelor est réalisé dans le cadre de l'examen final de la Haute école de gestion de Genève, en vue de l'obtention du titre d'économiste d'entreprise HES. L'étudiant accepte, le cas échéant, la clause de confidentialité. L'utilisation des conclusions et recommandations formulées dans le travail de Bachelor, sans préjuger de leur valeur, n'engage ni la responsabilité de l'auteur, ni celle du conseiller au travail de Bachelor, du juré et de la HEG.

« J'atteste avoir réalisé seul le présent travail, sans avoir utilisé des sources autres que celles citées dans la bibliographie. »

Fait à Genève, le 15.03.2013

Floride VIVANT

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Executive summary

The energetic question is one of the mainstays of industry and of a modern economy. Oil products are vital for any developed country: in Switzerland, they represent 57% of the Swiss energy needs with an average consumption of 12 million tons of oil each year. As Switzerland has no viable native sources of hydrocarbons, the country is completely dependent on imports of either crude oil and refined products in order to cover its needs. Switzerland does however dispose of two small refineries that can cover approximately 40% of its demand in oil based fuel.

The objective of this work is to assess the situation of those refining plants, to determine the influence of Libya on them and the Swiss crude imports, and to establish the potential futures of those facilities.

First, the Swiss federal oil supply policy is introduced in a first part: its legal basis, its different supply routes and transportation options for crude oil, the federal stance and an analysis on Swiss market trends. Are the Swiss refining capacities of vital importance to the confederation?

Second, the Swiss refineries, along with their basic functions ,economics for such facilities and history are described and analyzed. Do they make sense in a European refining sector in crisis?

Third, the evolution of Libya as a crude oil supplier over the last half decade is described. The consequences of two recent events on Swiss-Libyan relationship and the resulting shift in oil supply for the confederation is analyzed.

This analysis concludes on the shift by trading houses on downstream assets and the potential futures of the Swiss refineries: survival and closure.

This work is mainly based on personal research using official statistics, brochures newspaper articles and interviews of professional traders.

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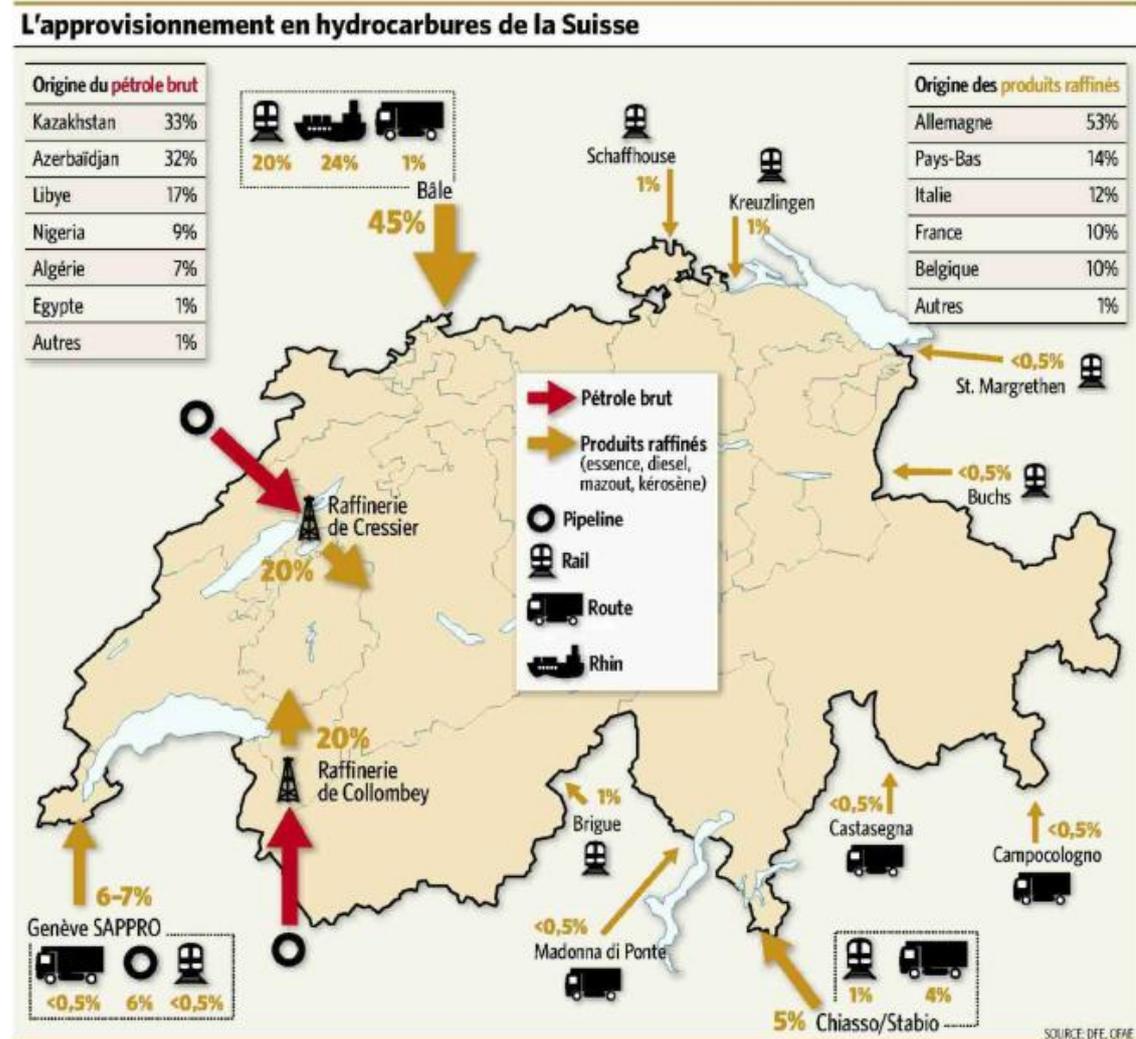
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Introduction

With a 57% share¹, oil is a major component of the Swiss energy bill. Switzerland being a landlocked country without any suitable oil reserves, it is situated completely **downstream** on the supply chain. This makes the need for reliable and diversified supply routes a strategic issue.



Sources: 1. BUSS, Bastien. Petroplus : fumée noire à Cressier. *LE TEMPS*. 25.01.2012 (consulté le 04.02.2012)

2. OFAE-DFE (Département fédéral de l'économie)

The above map describes the main supply routes for oil products (crude and refined) into Switzerland. According to OFAE (Office fédéral pour l'approvisionnement économique du pays) statistics, crude and petroleum products are coming in mainly by pipeline (46%), railways(24%), boat (on the Rhine river into Basel harbor, 24%) and

¹ OFAE. *Energie* (online). <http://www.bwl.admin.ch/themen/01008/index.html?lang=fr> (viewed on 28.06.2012)

marginally by roads(6%). Road transportation (the **most expensive** way of the lot) is mainly used by the Ticino canton, which rely almost exclusively² on oil-trucks coming in from refineries located in the north of Italy for its supplies.

Swiss refining capacities are concentrated in two facilities: in Cressier (NE) and in Collombey (VS). They can process 40%³ of the total national needs, the balance (60%) being refined products imported from European Union countries.

The subject of the present work is to determine the influence of Libya, both as a crude oil exporter and unofficial (through sovereign funds) owner of a Swiss refining plant, on the Swiss refineries and to answer the following problematic: **“What is the Swiss refineries situation and what future can be determined for them?”**. For this, the drastic shift that occurred at the end of the 2000s in Swiss crude oil supplies will be demonstrated and analyzed, along with its effects on the two refining installations mentioned above.

This work chapters will be organized as followed:

- Analysis of the Swiss oil supply policy, its legal basis, the Swiss market trends and the federal stance on the importance of national refineries.
- Analysis and description of the two Swiss refineries, their differences and see if they make sense economically.
- Analysis of Libya's influence and the shift in oil supplies for Switzerland at the end of the 2000s.
- Analysis of the trend by trading houses to invest in downstream assets, like refineries and answering the problematic by formulating potential futures for the Swiss refineries.

This subject has also been motivated by the recent events that influenced heavily, both in very different directions, the Libyan-Swiss relationship as trading partners: the arrest of Hannibal Kaddafi in 2008, and the civil war of 2011.

² *Pétrole : sur la route vers la Suisse* (online). UNION PETROLIERE. Zurich. 2004
<http://www.erdoel-vereinigung.ch/UserContent/Shop/Erdöl%20-%20der%20Weg%20in%20die%20Schweiz-f.pdf> (viewed on 03.07.2012)

³ OFFICE FEDERAL POUR L'APPROVISIONNEMENT DU PAYS. Approvisionnement de la Suisse. In :Poids des raffineries suisses dans l'approvisionnement en pétrole(online).10.01.2012, 1
p.<http://www.bwl.admin.ch/themen/01008/index.html?lang=fr> (viewed on 01.07.2012)

1. The Swiss federal oil supply policy

1.1. Description

The energetic issue is one of the pillars of industry and of a modern economy. Oil products are vital for any developed country: in Switzerland, the oil supply is regulated by two laws: The 1982 federal law on the country economical supply⁴ (loi sur l'approvisionnement du pays, LAP) and the 1998 law on energy⁵ (loi sur l'énergie, LEne).

The LAP define any commodity and good necessary for the needs of the Swiss economy, together with its storage and industry, as “goods & services of vital importance” which are not, or not sufficiently, present on national soil. Therefore, crude oil, refined oil products and the refining/storing installations should be classified as “vital” by the confederation. These “**vital goods**” are backed and supplied by the private sector, who can be compelled by Switzerland to keep minimal inventories to prevent shortage in the advent of a crisis. Those are called “strategic stocks” or “**compulsory reserves**” and can be considered as an insurance premium to guarantee the continuous well-being of the Swiss economy. (against exceptional events: war...)

LENE states that its objectives are to contribute to a **diversified, safe**, economical and environment compatible energetic **supply**, while promoting the development of renewable and local energy sources.

However oil alone represents 57%⁶ of the Swiss energy bill, and is naturally considered a “vital good” according to these laws, but not in its crude(unrefined) form as we will see later. The following chart shows the volumes, the needs to cover and the trends of different refined oil products used by the Swiss economy on the 31st of October 2011⁷.

⁴ SWISS CONFEDERATION. *Loi fédérale sur l'approvisionnement économique du pays*. 08.10.1982,01.01.2013. <http://www.admin.ch/ch/f/rs/5/531.fr.pdf> (viewed on 10.01.2013)

⁵ SWISS CONFEDERATION. *Loi fédérale sur l'énergie* 26.06.1998,01.07.2012. <http://www.admin.ch/ch/f/rs/7/730.0.fr.pdf> (viewed on 10.01.2013)

⁶ OFAE. *Énergie* (online). <http://www.bwl.admin.ch/themen/01008/index.html?lang=fr> (viewed on 28.06.2012)

⁷ OFAE. *Rapport sur le stockage stratégique*(online). 31.01.2012, p. 20. <http://www.bwl.admin.ch/themen/00527/index.html?lang=fr> (viewed on 10.01.2013)

Evolution of Swiss mandatory stocks in 2011:

Produit stocké	besoins à couvrir	volume actuel	tendance
Carburants et combustibles liquides			
- essence	4,5 mois	1 668 000 m ³	à la baisse
- kérosène	3 mois	416 000 m ³	en légère hausse
- diesel	4,5 mois	871 000 m ³	à la hausse
- mazout ⁸	4,5 mois	1 949 000 m ³	à la baisse
- bioéthanol	stockage étudié	-	pas de stock pour l'instant
(Mazout extra-léger stocké à la place du) Gaz naturel	4,5 mois	504 000 m ³	stable
Pétrole brut	-	-	pas de stockage

Source: OFAE. *Rapport sur le stockage stratégique*. Berne : DFE, 2012, p. 20.

This table gives some insights on the state of the Swiss market. First we notice that there is no strategic reserve imposed on crude oil, only refined products have to be stored because they represent 96% of transports energy sources and 50% of the heating needs⁸ of the country. These reserves are statistically suppose to cover the nation needs for a period between 3 and 4'5 months. According to the OFAE, if the level of overall demand has been stable for the last few years. On one side, gasoline and fuel oil consumption have decreased, while on the other side, diesel and jet fuel have progressed. The global volumes of strategic stocks after adaptations have been cut down by 250'000 cubic meters⁹ as a result of those trends, and because in order to cover the same needs, volumes must sometimes simply be reduced.

The oil compulsory stocks system is managed and supported by CARBURA¹⁰, a company controlled by the DFE (Département Fédéral de l'Economie) and which regroups all oil importers with import of more than 3000 cubic meters¹¹ per year to

⁸OFAE. *Rapport sur le stockage stratégique*(online). 31.01.2012, p. 21. <http://www.bwl.admin.ch/themen/00527/index.html?lang=fr> (viewed on 10.01.2013)

⁹OFAE. *Rapport sur le stockage stratégique*(online). 31.01.2012, p. 21. <http://www.bwl.admin.ch/themen/00527/index.html?lang=fr> (viewed on 10.01.2013)

¹⁰OFAE. *Rapport sur le stockage stratégique*(online). 31.01.2012, p. 7. <http://www.bwl.admin.ch/themen/00527/index.html?lang=fr> (viewed on 10.01.2013)

¹¹ CARBURA. *The purpose and tasks of CARBURA*(online).2013 http://www.carbura.ch/ueber_carbura.0.html?&L=2(viewed on 10.01.2013)

Switzerland (amongst which are Tamoil, Socar, Total and BP). The fact that crude oil is not considered as a good of vital importance (as no reserves of it are mandatory) tends to indicate that **federal authorities** are **privileging products importers rather than refiners**. Indeed, a country without refinery assets cannot buy crude oil to source its products in case of a shortage.

1.2. The Swiss oil/energy market trends

Switzerland needs in oil products have been stable since 1974¹² with an annual consumption of around 12 million tons. As previously stated, the Swiss refineries account for around 40% of those needs.

In 2009 the Swiss oil products consumption breakdown was mainly constituted by gasoline (27%¹³), heating fuel oil (37%), diesel (18%) and jet fuel (11%).

Ventes de produits pétroliers 2009

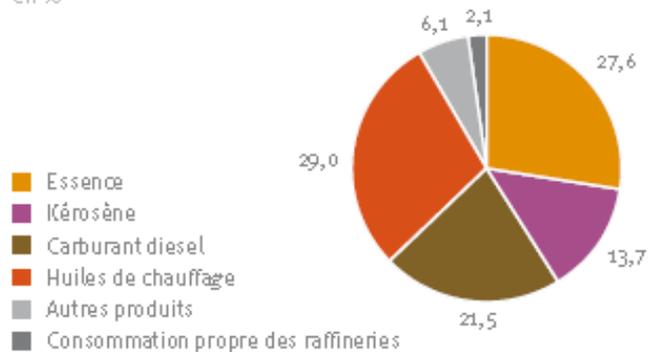
en %



Essence	26,8%
Kérosène	11,1%
Carburant diesel	18,1%
Huiles de chauffage	36,9%
Autres produits	5,0%
Consommation propre des raffineries	2,1%

Ventes de produits pétroliers 2011

en %



Sources: UNION PETROLIERE. 2009 Annual report(online). Zurich, 2010, p.25 / 2011 Annual report(online). Zurich, 2013, p.15

The second chart is confirming the previously stated tendencies: jet fuel and diesel consumptions are on the rise, whereas heating fuel oil is steeply declining (minus 7% in 2 years). The reasons behind those trends will be explained in the personal analysis section.

¹² OFFICE FEDERAL DE L'ENERGIE. Approvisionnement en pétrole de la Suisse. In :Les voies d'acheminement du gaz naturel et du pétrole devraient-elles être davantage diversifiées?(online). 2005, 5 p. http://www.bfe.admin.ch/themen/00486/00487/index.html?lang=fr&dossier_id=00743 (viewed on 29.06.2012)

¹³ UNION PETROLIERE. Rapport annuel 2009 (online). Zurich, 2010, p.25 http://www.erdoel-vereinigung.ch/UserContent/Shop/JB_2009_FR.pdf (viewed on 27.06.2012)

1.3. Does the confederation really needs refineries?

An official document of the OFAE¹⁴ dated January the 10th 2012, entitled “ The weight of Swiss refineries in oil supply” (see Annex number 1) states that if one of the two Swiss refining plant should shut down, the Confederation should import the equivalent of its production. It states that Europe clearly has a refining overcapacity as shown by the closure of the facilities in Cremona, Italy, and Reichstett, France. Furthermore, because Switzerland has diversified supply routes for refined oil products and because some, the Marseille-Geneva SAPPRO pipeline and the Rhine shipping lane, are currently not being used at full capacity, the country should even be able to compensate the closure of the two refineries by increasing its imports of refined products. This definitely shows that, at a federal level, these plants are not seen as strategic assets.

1.4. Personal analysis

According to established laws, the Swiss concerns are mostly regarding lowering environmental impact through reduced consumption, efficient use of resources, diversification of energy supplies and implementation of mandatory stocks.

Switzerland has established various supply routes for crude oil and refined products, a way for the Confederation to insure the safety of its supplies¹⁵ and furthermore fulfill the legally required “diversification”. This mix of supply routes also help balancing prices in the country through the competition among the various options it offers.

We will see further that in terms of origin of crude oil, this has not always been the case: Libya was an almost exclusive supplier of crude to the Confederation during the late 2000s.

Regarding the situation of federal reserves and the changes it illustrates on the state of the Swiss market, different trends stand out: gasoline and fuel oil consumption are decreasing, whereas diesel and jet fuel consumptions are increasing. What are the reasons of this evolution?

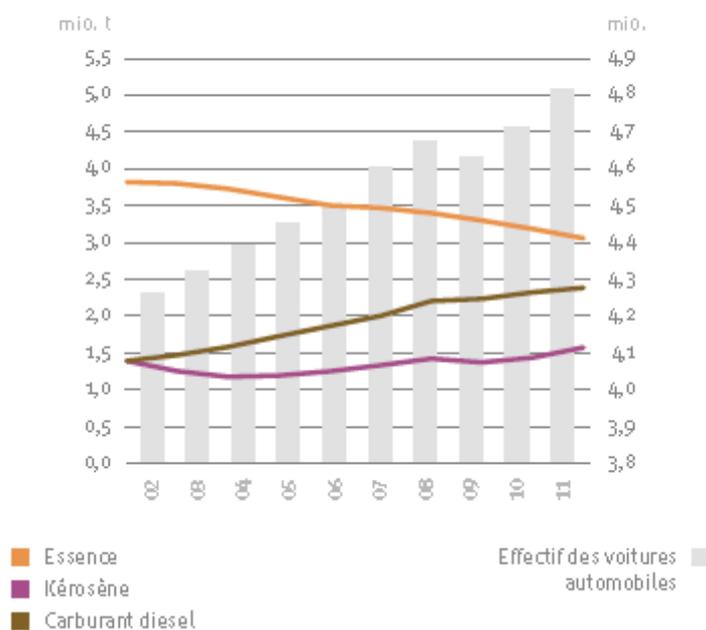
The main reason for the drop in gasoline consumption is the continuous progress in energetic efficiency of car engines: the average car gasoline consumption has

¹⁴ OFAE. *Poids des raffineries suisse dans l’approvisionnement en pétrole* (online). 10.01.2012. <http://www.bwl.admin.ch/themen/00527/index.html?lang=fr> (viewed on 14.01.2013)

¹⁵ UNION PETROLIERE. OILFACTS.CH. *Site de l’union pétrolière* (online). http://www.erdoel-vereinigung.ch/fr/oilfacts/Energielandschaft_Schweiz/Erdoelversorgung.aspx(viewed on 28.06.2012)

diminished by more than 23%¹⁶ since 2000 to reach 6.58 liters per 100 kilometers in 2011. This trend was reinforced by the strength of the Swiss Franc versus the Euro, which reduced the numbers of foreign customers at border gas stations, especially during the second half of 2011. Heating oil follows the same trend because of the improvement of building thermal insulation and the implementation of modern fuel oil condensation heating system, a much more efficient technique than older ones. Mild weather and a generally much more warm year than 2010 also impacted consumption. The rise in diesel consumption, mainly used by the building and transport sectors, is reflecting the Swiss economy dynamism, added to the fact that diesel powered cars are now representing 32%¹⁷ of new cars registered within the country. Even if diesel cars are more expensive than gasoline ones and that diesel is more expensive as a fuel in Switzerland, more and more Swiss are attracted by this type of engines, especially because of their lower fuel consumption. A cross border arbitrage also exists with diesel being cheaper in bordering countries such as France and Italy. Jet fuel increase in consumption is mainly due to the traffic growth of Geneva and Zurich airports, with a rise of 6,6% in 2011.

Consommation de carburants et effectif des voitures automobiles



Sources: UNION PETROLIERE. 2011 Annual report(online). Zurich, 2013, p.15

It is safe to say that the Swiss domestic car market is the main lever influencing the trend in gasoline and diesel production. The following chart shows the fact that, even so the number of cars on the Swiss market is steadily growing, gasoline consumption keeps declining and diesel's keeps rising.

This situation, with a lower proportion of diesel than gasoline cars, is the direct result of the local tax system. In Europe, only Switzerland,

Germany and the United kingdom are taxing diesel at the same level than gasoline, thus making this type of fuel more expensive and less attractive to their citizens.

¹⁶ UNION PETROLIERE. *Rapport annuel 2011* (online). Zurich, 2013, p.15 http://www.erdoel-vereinigung.ch/UserContent/Shop/JB_2009_FR.pdf (viewed on 25.02.2013)

1.5. Summary

- Switzerland is a landlocked country with no crude oil reserves and two small refineries covering approximately 40% of its needs. Therefore it is a major importer of light refined products (gasoline, diesel and jet fuel).
- Its supply policy is defined by two laws: the 1982 LAP and the 1998 LENE.
- In accordance with its legal obligations, it has diversified supply routes for crude oil and refined products: pipelines, railways, trucks and barges on the Rhine river.
- It is legally obligated to have minimum stocks of refined oil products to act as a buffer against any shortage or crisis.
- Refineries are not considered of vital importance by the federal government: it officially states that they could be replaced by rising imports in case of closures.
- Overall national fuel consumption has been stable for the past 30 years at around 12 million tons.
- Gasoline consumption has been steadily declining, whereas diesel consumption is growing by around 8% per year since 2003, mainly due to the influence of the Swiss domestic car market.
- The lower part of diesel in the Swiss car park is a result of the Swiss tax system, which taxes this distillate fuel like gasoline, thus making it more expensive than most neighboring European countries.

2. The Swiss refineries:

Switzerland has two refineries, one in Cressier and one in Collombey. These two facilities produced respectively 2.5 and 2.4 million tons when fully functional in 2010*, equivalent to a daily production of approximately 47'000 and 45'000 barrels. Considering that the world's biggest refinery in Venezuela has an output of around 940'000 bbl/day¹⁸ and that the next 40 installations on the list produce more than 300'000 bbl/day, the Swiss refineries are comparatively very small.

Cressier is a former property of the Petroplus group, a Swiss Oil trading company that went bankrupt at the beginning of 2012¹⁹ after the freezing of bank loans during the summer of 2011, while the second belongs to the Tamoil group. The Cressier refinery has since been bought back by the Varo Energy Holding²⁰, a subsidiary company of the Vitol oil-trading house, and has resumed its operation since July 2012²¹.

2.1. Basic functions and economics of a refinery:

What is a refinery?

A refinery is a manufacturing plant **processing crude oil into a panel of refined products**. The actual production by a refinery depends on various factors: the processing units, the refining process being used and the quality of the feedstock being transformed. These plants are situated **downstream** the oil production chain.

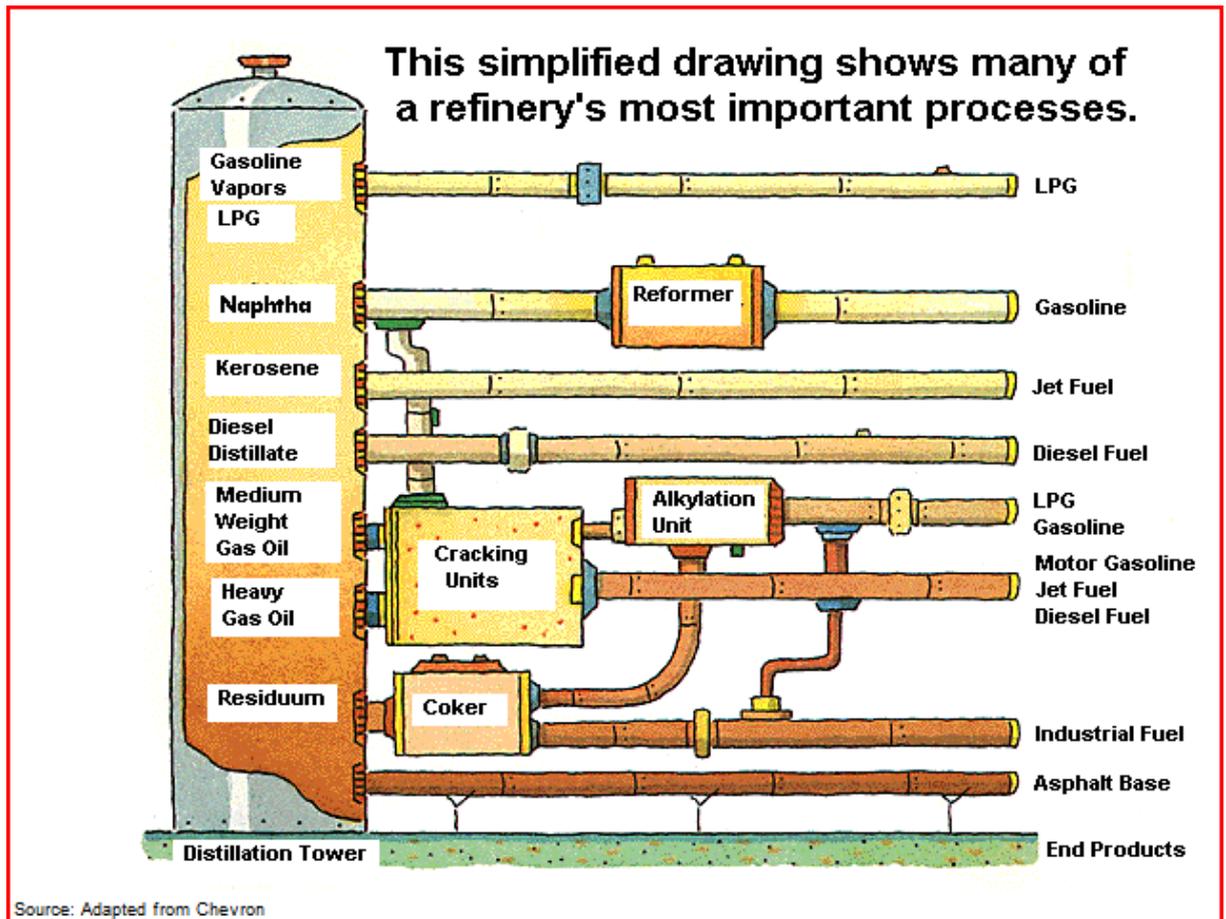
*The significant rise in output (47'000 to 68'000 bbl/day) between 2010 and today for Cressier refinery is a direct consequence of the general strike in autumn 2010 that paralyzed the Fos-sur-Mer oil terminal where its feedstock are originating.

¹⁸ PETROFINDER. *Top 42 world's largest oil refineries(barrels per day)*(online).31.05.2009. http://www.petrofinder.com/carbon/carbon_read.php?id=635 (viewed on 15.02.2013)

¹⁹ BUSS, Bastien. Petroplus : fumée noire à Crissier. *LE TEMPS*. 25.01.2012 (viewed on 04.02.2012)

²⁰ Les 270 employés de la raffinerie de Cressier bientôt au travail. *Radio Télévision Suisse RTS INFO* (online).04.07.2012. <http://www.rts.ch/info/regions/neuchatel/4114944-les-270-employes-de-la-raffinerie-de-cressier-bientot-au-travail.html> (viewed on 12.07.2012)

²¹VARO ENERGY HOLDING SA website, [varoenergy.com](http://www.varoenergy.com)(online).2013 <http://www.varoenergy.com/en/product-supply-and-distribution> (viewed on 14.01.2013)



Source: US Energy Information Administration 28.06.2012

What does a refinery do?

Crude oil contained many hydrocarbon compounds that must be separated and refined before commercial use. To fulfill this goal, the operations of a refinery follow **three basic steps**²²:

- Separation of the various petrochemicals contained in the crude.
- Conversion of this separated petrochemicals into the desired and/or higher valued products.
- Chemical treatment of the created products in order to remove impurities such as sulphur and metals.

What are the economics of a refinery?

Refining is primarily a **margin based business** in which both its inputs (crude oil) and its outputs (refined products) are commodities. Localization of a refinery is crucial as it will be tributary to the different attributes of its regional market: variation in supply and

²² US Energy Information Administration website. *How crude oil is refined into petroleum products*(online). 28.06.2012
http://www.eia.gov/energyexplained/index.cfm?page=oil_refining#tab2 (viewed on 14.01.2013)

demand and transportation pressures. Key questions in refining are²³:” what type of crude oil to process, what kind of equipment to invest in, and what range of products to manufacture.” Its production yield will depend on the processes that it used and the type of crude oil being processed. A refinery is a heavy costs installation, and once designed for a certain type of crude and with a certain type of configuration, **nothing can be done to modify its yield structure without major investments.**

How can we calculate refining margins?

“**Crack spread**” is the name given to the difference between crude oil prices(which is set on a global marketplace) and refined oil products prices(which can be affected by local and seasonal factors), this term is used as a benchmark indication to estimate refining margins. Comparing those two prices can give an indication of supply conditions in a given market but also help to determine the economic viability of refining installations. However, crack spreads do not take into account all refined products revenues and any refining costs other than the cost of crude oil.

There are two types of crack spreads²⁴: the single-product and the multi-products crack spreads. The first one shows the difference in prices between a barrel of the specified product and a barrel of crude oil. In general for the price of a barrel of crude oil, benchmarks such as the WTI (West Texas Intermediate) or LLS (Louisiana Light Sweet) are used. The second one is generally expressed by a set of numbers, the most common being the 3:2:1,the 2:1:1 and the 5:3:2. crack spreads.

“The Swiss refineries operates under a **6:3:2:1** crack spread.” (Ludwig Hachfeld, SOCAR trading project director)

The 6:3:2:1 cracks spread shows the gross margin that would be realized when a refiner purchases 6 barrel of sweet light crude (of which the BRENT is a benchmark, amongst others), and produces three barrels of diesel, two barrels of gasoline and one of fuel oil.

²³ NORTH ATLANTIC. *Refining 101*(online).2006. <http://northatlantic.ca/Refining101.asp> (viewed on 14.01.2013)

²⁴ US Energy Information Administration website. *An introduction to crack spreads*(online). 28.06.2012<http://www.eia.gov/todayinenergy/detail.cfm?id=1630>(viewed on 14.01.2013)

Crack spread is also useful to help refineries to **manage** their **price risk**²⁵ through hedging. With this ratio they can assess their position and develop a crack spread futures market strategy. For example if the plant follows a 3:2:1 refining ratio, it should sell two gasoline and one heating oil futures contracts and buy three crude oil futures contracts in order to lock their 3:2:1 differential.

How can we estimate the efficiency of a refinery?

The daily production capacity of a refinery is not the only factor to take into account to evaluate the installations of a refinery. The **Nelson complexity index**, developed by W.L. Nelson at the beginning of the 1960s, is used to quantify the relative cost of components that make up a refinery. It is a measure of secondary conversion capacity in comparison to the most basic refining function: crude oil distillation (known as the atmospheric distillation unit). It is an indicator of the investment intensity or cost index of the refinery and also the addition potential of a refinery (see Annex 2 for method of evaluation and rating used by the index): it basically rates the overall quality of the installations.

²⁵ CME GROUP. *Introduction to crack spreads*(online).25.07.2011. http://www.cmegroup.com/trading/energy/crack-spread-handbook.html_p.5. (viewed on 08.03.2013)

2.2. Tamoil/ Collombey

The Valais installations in Collombey, situated at the eastern tip of the Geneva lake, is the property of the Tamoil group²⁶. According to the Tamoil website, its actual production is around 2,7 million tons a year of refined products, around 54'000 barrels per day. Its feedstock is coming from Genoa harbor in Italy through a 340 km long pipeline called, along its final part the "Oléoduc du Rhône" (starting from the town of Ferrera in Italy to Collombey). Its refined products range from gasoline, jet fuel, light fuel oil, heavy fuel oil to liquefied petroleum gas (LPG). Its output represents close to 19% of Swiss national consumption. It employs more than 224 people and is an important buyer of goods and services throughout the region. Its refining units are : an atmospheric distillation unit, a vacuum distillation unit, a fluidized catalytic cracker and a catalytic reformer.



Aerial view of the Tamoil oil refinery in Collombey.

Source: (KEYSTONE/Alessandro Della Bella)

²⁶ TAMOIL (SUISSE) SA website, *TAMOIL.ch* (online). 2012
<http://www.tamoil.ch/FR/Activite/Raffinerie/> (viewed on 27.07.2012)

The pipeline used to feed this refinery has the particularity of passing through the Grand Saint Bernard tunnel²⁷ which runs at a high altitude and can know deep freezing temperature in winter. Thus the crude oil being pumped needs to be light.

“This particularity forces you to have a type of oil that is not-viscous enough so that it can be pumped upward this pipeline and has a low freezing temperature property, otherwise you will find yourself with the biggest oil candle in the world.” (Ludwig Hachfeld, SOCAR trading project director)

Tamoil controls 20%²⁸ of the incoming crude within Switzerland. Tamoil (Suisse) SA is the number one²⁹ oil company active on the Swiss market. A vertically integrated company, its business runs from production to commercialization and distribution. It is a subsidiary of the Oilinvest (Netherlands)B.V. group³⁰, which is also present in 4 other European countries: France, Italy, Germany and the Netherlands.

The official website does not mention that Libyan funds have always been present in Tamoil in more than one way³¹. Tamoil is the result of the purchase by Lebanese born US citizen Roger Tamraz of the company Amoco and Texaco's former Italian operations, which included more than 2,000 gas stations, hundreds of miles of pipelines and one refinery in Italy (Cremona). This operation was financed in part by the Libya Arab Foreign Bank. In 1988, Oilinvest acquired a majority share in Tamoil, before acquiring it outright. This group used to be owned at 100% by LAFICO (Libyan Arab Foreign Investment Company), a holding of the Libyan Investment Authority, until 1993 when it sold 55% of its shares in Tamoil. This basically makes the Tamoil group a **property of the Libyan government.**

“The Libyans bought Tamoil as a way to safely bring their money within Switzerland, and also as a way to avoid international sanctions on the country at the end of the 1980s.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa).

²⁷ TUNNEL DU GRAND-SAINT BERNARD. *Rapport Annuel 2007*.(online)26.06.2008

²⁸ OFAE. In :Poids des raffineries suisses dans l'approvisionnement en pétrole(online).10.01.2012,1p.<http://www.bwl.admin.ch/themen/01008/index.html?lang=fr>(viewed on 01.07.2012)

²⁹ TAMOIL (SUISSE) SA website, *TAMOIL.ch* (online). 2012
<http://www.tamoil.ch/FR/Activite/> (viewed on 27.07.2012)

³⁰ TAMOIL (SUISSE) SA website, *TAMOIL.ch* (online). 2012
<http://www.tamoil.ch/FR/La+Societe/>(viewed on 27.07.2012)

³¹ DAVJO. Oilinvest... and the mysterious 3 i's. In: boards.fool.co.uk (online) 08.05.2004
<http://boards.fool.co.uk/oilinvest-and-the-mysterious-3-is-8550054.aspx> (viewed on 06.08.2012)

2.3. Petroplus-Vitol/Cressier

This refinery, located in Cressier close to the city of Neuchâtel, is the former property of Petroplus, Europe's biggest independent refining company³² which went bankrupt in January 2012. Commissioned in 1965³³ by the Dutch oil company Shell, it was purchased by Petroplus in 2000 and then acquired by Varo Energy Holding SA in mid-2012. The sale to this joint venture between the Vitol Group (75%), a Dutch multinational energy and commodity trading company, and AtlasInvest (25%), a private investment group focusing on the sector of energy, was completed on June 29th 2012. The installations were fully functional again since late July 2012 after the change of ownership.



Aerial view of the Varo refinery in Cressier Source: Swiss Air Force

According to the official Varo website, the site has a daily production of around 68'000 barrels of refined products, which amount to around 3.4 million tons a year. Its feedstock is coming through the SPSE(Société du Pipeline Sud-Européen) pipeline from the shipping terminal of Fos-sur-Mer in the south of France. The majority of it is **light sweet crude** with a smaller part being sour crude oil. Nowadays its production, ranging from light and middle distillates (gasoline, diesel, blended diesel and jet fuel),

³² MEYER Gregory, Refinery closures raise fears on oil prices. *FINANCIAL TIMES FT.com* (online) 05.01.2012 <http://www.ft.com/cms/s/0/09728c00-37ab-11e1-a5e0-00144feabdc0.html#axzz23n6DpN1Q> (viewed on 27.07.2012)

³³VARO ENERGY HOLDING SA website, *varoenergy.com*(online).2013 <http://www.varoenergy.com/en/background> (viewed on 14.01.2013)

correspond in volume to about 25%³⁴ of the Swiss market needs in refined products. Its Nelson Complexity rating is 6.4 and it employs 270 people³⁵. Its refining units are: an atmospheric distillation unit, a vacuum distillation unit, an isomerization unit, a catalytic reforming unit, a desulfurization unit, a thermal cracking unit, a visbreaking unit and a bitumen plant.

2.4. Main differences

Cressier output is significantly larger (21%) than the output of Collombey. They differ in their final products: Tamoil is producing heavier distillates such as heavy fuel oil when Varo is only producing light and middle distillates in its Neuchâtel installation: this is putting Cressier more in accordance with the Swiss market as Diesel consumption is rising and heavy fuel oil decreasing. By the number of refining units, Cressier seems to be a more complex (and valuable) design than the one of Collombey: we can state that the Tamoil refinery Nelson complexity index will be lower than the 6.4 of Cressier.

“Gasoline is the basis of Collombey’s production and Cressier produces low sulfur diesel, thanks to its desulfurization unit.” Those two distillates are the flagship products of each installation according to Ronald Engels, Collombey’s former chief of conversion unit³⁶.

³⁴VARO ENERGY HOLDING SA website, *varoenergy.com*(online).2013
<http://www.varoenergy.com/en/product-supply-and-distribution> (viewed on 14.01.2013)

³⁵ Les 270 employés de la raffinerie de Cressier bientôt au travail. *Radio Télévision Suisse RTS INFO* (online).04.07.2012. <http://www.rts.ch/info/regions/neuchatel/4114944-les-270-employes-de-la-raffinerie-de-cressier-bientot-au-travail.html> (viewed on 12.07.2012)

³⁶ SALLIER Pierre-Alexandre, La Suisse doit garder ses raffineries. *LE TEMPS* (online) 02.05.2012 <http://www.letemps.ch/Page/Uuid/12dad742-93b4-11e1-bc34-66a8f1ec171b%7C0> (viewed on 24.06.2012)

2.5. Do they make sense?

A sector in crisis³⁷: the 115 European refineries are suffering from **structural overcapacities**, mostly because they are producing more gasoline than diesel when the average European consumer favors the latter and because European global demand for fuel is steadily decreasing (European demand fell by 1.3 million barrels/day³⁸ between 2006 and 2011). France for example imported 18 million tons³⁹ of diesel in 2011 (60% from Russia), half of its total needs. Interviewed by le Figaro newspaper, Jean-Louis Schilansky, president of the Union française des industries pétrolières (Ufip), declared: “Today, we estimate between 20 and 25 the number of installations that are either in the process of closing, or of being sold, in a critical state”. This was confirmed by Toril Bosoni, IEA refining analyst: “We still see more closures to come in Europe”. This is illustrated by the permanent closures of Gunvor’s installations in Ingolstadt, Germany, and Petroplus plant in Coryton, United Kingdom, amongst others in 2012 alone.

The European refining market saw a combined 1 million barrels/day of installation closure since 2009 and in April 2012, THE IEA (International Energy Agency) estimated that an additional 2.3 million barrels/day⁴⁰ of European capacity may need to be permanently shut down to bring it back into balance.

This chronic overcapacity forced, and is still forcing many smaller, less profitable refineries to close. Swiss refineries are in this position: they both produce less than 70,000 bbl/day which limit their abilities to take advantage of **economies of scale**, where it could have ensured their continuous survival during lean period, when margins narrowed (expressed by low or **negative crack spreads**). Their **level of complexity** (Nelson index of 6.4 and lower), and overall quality, are low compared to the European average (6.5) and the American one (9.6)⁴¹.

³⁷ MEYER Gregory, Refinery closures raise fears on oil prices. *FINANCIAL TIMES FT.com (online)* 05.01.2012 <http://www.ft.com/cms/s/0/09728c00-37ab-11e1-a5e0-00144feabdc0.html#axzz23n6DpN1Q> (viewed on 27.07.2012)

³⁸ IFP ENERGIES NOUVELLES. *PANORAMA 2011 Refining: varying conditions by region*(online) p.2 (viewed on 17.01.2013)

³⁹ REUTERS, Raffineries en Europe :20% « en danger ». *Le Figaro.fr*(online). 01.02.2012. <http://www.lefigaro.fr/flash-eco/2012/02/01/97002-20120201FILWWW00360-raffineries-en-europe-20-en-danger.php> (viewed on 26.07.2012)

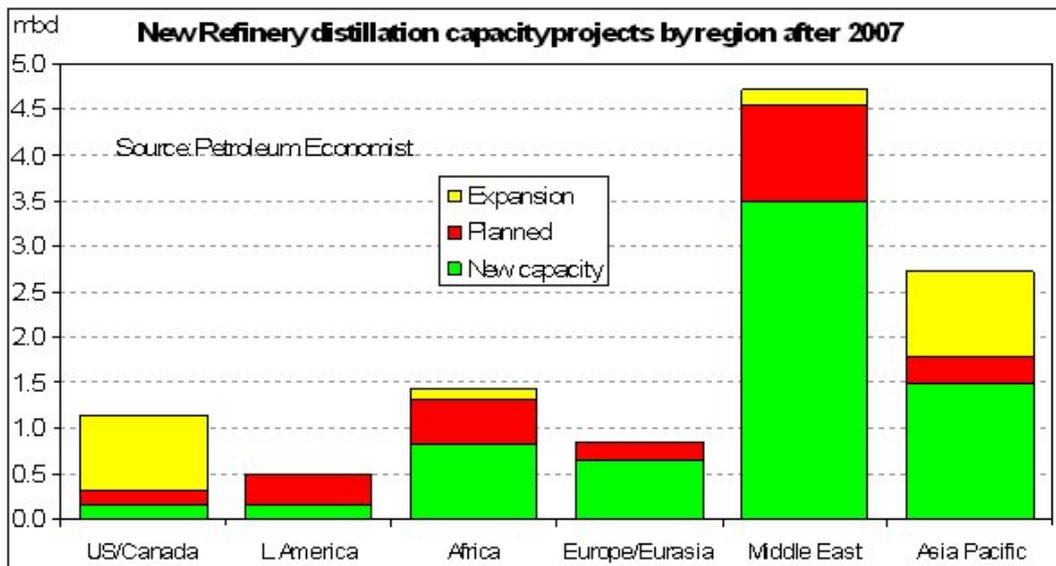
⁴⁰ IFP ENERGIES NOUVELLES. *PANORAMA 2011 Refining: varying conditions by region*(online) p.2 (viewed on 17.01.2013)

⁴¹ UNIVERSITY OF OXFORD. *The impact of Russia’s Refinery upgrade plans on global fuel oil markets*(online)07.2012. p.3 <http://www.oxfordenergy.org>(viewed on 17.01.2013)

“One determining factor is the level of complexity, when you look at it, the less sophisticated refineries are going to be out of the picture in the near future. It is my opinion that this is the case of the Swiss facilities, they are in the red zone. The idea is that the smaller a refinery, the less flux you have to complicate. For example if you have a very big one, with more than 400,000 bbl/day, you have enough flux inside the installations to cook, convert and re-convert your crude until every drop has been refined. This is impossible with a small refinery of 80’000 bbl/day or less, with such a small production you do not have this capacity.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa).

“You cannot economically have that kind of capacity unless your installation produces more than 200,000 bbl/day.”(Ludwig Hachfeld, SOCAR Trading project director)

To put it into context, the Reliance group refinery in Jamnagar, India, operating since 2008, has an output of 29 million tons per year⁴² (580,000 bbl/day) and a Nelson complexity of 14.0, which put the Swiss plants down in a whole other league. In fact most new refining installations are being built in the Middle and Far East to respond to the booming demand for fuel in those parts of the world and their size and proximity to crude extraction ensure higher than average margins and greater economies of scale.



Source: INTERTANKO, *World refinery capacity is tight*(online), 29.11.2007

⁴² REUTERS, Reliance Jamnagar refinery configuration, output(online). 02.04.2009. <http://webcache.googleusercontent.com/search?q=cache:i7pQK3sFYrcJ:in.reuters.com/article/2009/04/02/reliance-refinery-idINDEL43753820090402+reliance+jamnagar+output&cd=1&hl=fr&ct=clnk&gl=ch&client=safari> (viewed on 8.02.2013)

The above graph illustrates the massive difference in refining capacities, both actual and planned, between the continents: the middle East and Asia are the new giants in the industry.

”They are building massive plants in the Persian Gulf, monsters producing more than 400,000 bbl/day, using terrible quality oil. They are so complex that they can refine it to the last drop. These new refineries are adding pressure on the already stressed European facilities, so logically some are going to go under and close down.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa).

“Now there is an universal rule for refineries throughout the world: **bigger is better.**” (Ludwig Hachfeld, SOCAR Trading project director)

Furthermore, the fact that Swiss plants are designed to treat mainly light sweet (high quality and highly sought after, thus coming at a premium) types of crude oil, they cannot fully enjoy more favorable margins by purchasing only sour crude, as sour crude oil traditionally sells at a discount to light sweet crude benchmark, such as the BRENT or WTI.

“A refinery can only survive if its marketing margins are such as to compensate its low refining margins. This should be the case for Tamoil and for Cressier in their surrounding areas of distribution. These plants only make sense if their selling prices are lower than the gate-prices of the imported products from the European Union. Because the refineries are already inside the country their refined products should sell a bit cheaper than the ones coming from outside the country. This is simply the result of transportation costs of the imported refined products versus the local production. If neither of these conditions are met, the facilities will shut down. ” (Philippe Evrard, former TOTAL crude oil trading manager West Africa).

2.6. Summary

- Refining is a margin based business. Crack spread (price difference between a barrel of crude and a barrel of distillate) is the most used financial index to evaluate said margins. An average 6:3:2:1 crack spread is used for Swiss refineries.
- Crack spread is also useful to determine the refiner hedging strategy in order to manage price risk.
- Once designed for a certain type of crude and a certain type of process, a refinery yield structure cannot be modified without heavy investments.
- The cost index and overall quality of a refinery is rated through the Nelson complexity index.
- The biggest Swiss refinery is located in Cressier near Neuchâtel and is owned by Varo Energy Holding since the spring 2012. It was acquired from Petroplus.
- The second Swiss refining plant is located in Collombey, in Valais, and is the property of Tamoil SA, a company owned by Libyan sovereign funds.
- With a production of less than 200,000 bbl/day each, both Swiss refineries are very small in comparison to new installations in Asia and the Middle-East, and even older ones in the US and therefore cannot rely on economies of scale. “Bigger is better” is now the rule for refining installations.
- Their overall complexity is below the European average and cannot even compete with the new plants located in the Middle East and Asia. “Bigger is better”.
- The two preceding factors tend to indicate that they are doomed on the short-middle term.

The above tables show the origin of crude oil imports to Switzerland by country from 2007 to 2011. The main crude oil exporting countries to Switzerland were, during this period, Libya, Kazakhstan and Azerbaijan. However, we can see that the importance of these three countries shifted dramatically over the last 5 years. All these countries possess important reserves of high quality light and sweet crude, which is what the Swiss refineries are mainly designed to process. Other African countries represent smaller shares.

Libya (highlighted in red) used to provide more than half of Switzerland's crude oil up until 2008, with a record peak of 73,1% of total Swiss imports this year; by 2011, this percentage had crumbled to a ludicrous 4,5%. Why was Libya so important? What factors can explain this major shift? What took the place of Libyan crude in Swiss refineries?

3.2. Libya

Libya is a north-African country on the shore of the Mediterranean Sea, bordered by Tunisia, Algeria, Niger, Chad, and Egypt⁴³. It is situated in a quite unstable region of the world, with Algeria and Chad knowing active armed rebellions⁴⁴. Up until the recent civil unrest that saw the end of the reign of Colonel Muammar Kaddafi in 2011⁴⁵, Libya was an authoritarian state with power remaining essentially in the hands of Kaddafi's inner circle.

However, oil was discovered in Libya in 1956⁴⁶ and has been its main source of revenue ever since. Crude oil represents 95%⁴⁷ of its exports earnings, 65% of its GDP and 80% of government revenue. Even though most of this wealth stays in the hand of

⁴³ Libya. *Encyclopædia Britannica. Encyclopædia Britannica online Academic Edition.*(online) modified on 27.06.2012 <http://www.britannica.com/EBchecked/topic/339574/Libya> (viewed on 27.06.2012)

⁴⁴ Libya. *Central Intelligence Agency. CIA the WORLD FACTBOOK.* (online) modified on 31.07.2012 <https://www.cia.gov/library/publications/the-world-factbook/geos/ly.html> (viewed on 27.06.2012)

⁴⁵ Libya. *Encyclopædia Britannica. Encyclopædia Britannica online Academic Edition.*(online) modified on 27.06.2012 <http://www.britannica.com/EBchecked/topic/339574/Libya>(viewed on 27.06.2012)

⁴⁶ Libya. *Encyclopædia Britannica. Encyclopædia Britannica online Academic Edition.*(online) modified on 27.06.2012 <http://www.britannica.com/EBchecked/topic/339574/Libya> (viewed on 27.06.2012)

⁴⁷ Libya. *Central Intelligence Agency. CIA the WORLD FACTBOOK.* (online) modified on 31.07.2012 <https://www.cia.gov/library/publications/the-world-factbook/geos/ly.html> (viewed on 27.06.2012)

the governing body, this, coupled with the small population (less than seven million people) gives Libya the highest per capita GDPs⁴⁸ of the African continent.

According to 2010 estimates, Libya produces 1.789 million⁴⁹ bbl per day, and is the second North-African producer behind Algeria. 88% are exported, the rest is kept for domestic consumption. Libya is the first North-African exporter of crude. In 2011, its proven oil reserves amounted to 46.42 billion barrels, the ninth most important in the world⁵⁰ and the biggest in Africa. However these numbers need to be put into perspective as they do not take into account the impact of the 2011 war that severely disrupted production⁵¹.

Libya possesses massive reserves of crude oil. The main interest for developed countries which import this oil is, first of all, its “very good quality”⁵² as Niklauss Boss, Union Pétrolière director, describes it. Libyan crude is of “**light**” and “**sweet**” types⁵³. Light means that it has a low viscosity, flows freely at room temperature and can produce more gasoline or diesel with the same volume: thus it is a very sought after type of crude. Sweet means that it has a low sulfur content, thus producing less corrosion and pollution⁵⁴ than other “sourer” crudes, a quality especially attractive to countries with **strict environmental norms**, like Switzerland.

⁴⁸ Libya. *Central Intelligence Agency. CIA the WORLD FACTBOOK.* (online) modified on 31.07.2012 <https://www.cia.gov/library/publications/the-world-factbook/geos/ly.html> (viewed on 27.06.2012)

⁴⁹ Libya. *Central Intelligence Agency. CIA the WORLD FACTBOOK.* (online) modified on 31.07.2012 <https://www.cia.gov/library/publications/the-world-factbook/geos/ly.html> (viewed on 27.06.2012)

⁵⁰ COUNTRY COMPARISON::OIL-PROVED RESERVES. *Central Intelligence Agency. CIA the WORLD FACTBOOK.* (online) modified on 31.07.2012 <https://www.cia.gov/library/publications/the-world-factbook/geos/ly.html> (viewed on 27.06.2012)

⁵¹ AFRICAN ECONOMIC OUTLOOK. *Libya 2012 annual report* (online)., 2012, p.1 <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Libya%20Full%20PDF%20Country%20Note.pdf> (viewed on 04.07.2012)

⁵² VOGEL, Susan. Des pistes pour une reprise des affaires en Lybie ?. *SWISSINFO.ch* (online). 27.10.2011. http://www.swissinfo.ch/fre/dossiers/le_printemps_arabe/Des_pistes_pour_une_reprise_des_affaires_en_Libye.html?cid=31381938 (consulted on 04.07.2012)

⁵³ Light Sweet Crude Oil. In : *Financialadvisory.*(online) 2011. <http://www.financialadvisory.com/dictionary/term/light-sweet-crude-oil/> (viewed on 05.07.2012)

⁵⁴ Libya. *Encyclopædia Britannica. Encyclopædia Britannica online Academic Edition.*(online) modified on 27.06.2012 <http://www.britannica.com/EBchecked/topic/339574/Libya> (viewed on 27.06.2012)

3.3. What happened?

Libya looked like a solid partner in oil trade for Switzerland: a **geographically close country** with **important reserves of high quality crude**. The confederation seems to have omitted one capital criteria in the establishment of long lasting trade relations: the country risk, which in 2010⁵⁵ was according to the CRT (Country Risk Tier⁵⁶) method already one of the worst that can be. This relationship did not take into account the fact that Libya was really a dictatorship, with a **very irritable leader**, in a region about to explode into open revolution and **war**.

3.3.a Hannibal Kaddafi's arrest & Libyan trade embargo

The arrest of Hannibal Kaddafi and his wife in Geneva⁵⁷, on the 15th of July 2008, for bad treatment upon their employees, is an act for which the Libyan leadership took offense and started a long and hurtful diplomatic crisis between the two countries. To avenge this, the list of measures of retaliation⁵⁸ taken by the Colonel is long indeed. However, its main consequence for the Swiss refineries was the embargo decreed by Libya on July 19th 2008 and the immediate end of its crude oil exports to Switzerland

Despite all the efforts of the Swiss diplomacy, this demonstrated the inadequacy of the then Swiss oil supply policy. Strategic stocks notwithstanding, Switzerland had to diversify its oil suppliers in order to avoid a shortage that could heavily impact its economy. Interviewed by the website *Swissinfo.ch*⁵⁹, two specialists resume the situation. Jan Atteslander, *Économiesuisse's* foreign affairs chief, states: "Libya was one of our major supplier, but this has completely changed now and, since the embargo, we never lacked crude oil at any time." This is confirmed by Niklauss Boss,

⁵⁵ AMB Country Risk Report, Lybia. *AMBEST.com* (online) 28.09.2011
<http://www3.ambest.com/ratings/cr/reports/Lybia.pdf> (viewed on 24.07.2012)

⁵⁶ Country Risk Tier : method used to evaluate the economical, political and financial system of a specific country

⁵⁷ Gaddafi arrested. *BBC NEWS* (online). 17.07.2008.
<http://news.bbc.co.uk/2/hi/africa/7512925.stm> (viewed on 03.07.2012)

⁵⁸ VOGEL, Susan. La crise libyenne dans le rétroviseur. *SWISSINFO.ch* (online). 03.12.2010.
http://www.swissinfo.ch/fre/politique_suisse/La_crise_libyenne_dans_le_retroviseur.htm?cid=28945962 (viewed on 03.07.2012)

⁵⁹ VOGEL, Susan. Des pistes pour une reprise des affaires en Lybie ?. *SWISSINFO.ch* (online). 27.10.2011.
http://www.swissinfo.ch/fre/dossiers/le_printemps_arabe/Des_pistes_pour_une_reprise_des_affaires_en_Lybie.html?cid=31381938 (viewed on 04.07.2012)

director of the Union Pétrolière: “ Imports from Libya have been integrally replaced by oil from other countries, notably from Kazakhstan and Azerbaijan.(...)” This is also illustrated on the preceding boards (highlighted in green): Kazakh imports⁶⁰ jumped from 16% to 27,7% and Azerbaijani from 2% to 20% between 2008 and 2009.

3.3.b The 2011 Libyan civil war

The spring of 2011 saw popular uprisings and revolts throughout the Arab countries. It was triggered when a young Tunisian, Mohammed Bouazizi⁶¹, immolated himself on the 17th of December 2010 to protest against the seizure of its merchandises by the local police: it was the “Arab Spring”. The following month in Libya, rallies were violently repressed as they appeared, notably in the city of Benghazi. The repression reached such degrees of violence against civilians that in less than two weeks⁶² after the first popular uproars, the UN adopted a resolution which applied a weapon embargo on Libya, a freeze of Kaddafi’s family assets and “crime against humanity” charges. This situation escalated into a full-out civil war with an armed rebellion, supported by airstrike from NATO nations, finally overthrowing Kaddafi’s rule.

This episode of Libyan history marked the end of one of the biggest obstacles to Swiss-Libyan relations and trade impersonated by Muammar Kaddafi: when the Colonel’s death became public, the Swiss press printed titles⁶³ such as “Finally”, “They got him!” or “Happy end for Libya”. This shows the nation resentment towards the former dictator and the vivid hope for a new start between the two countries.

⁶⁰ UNION PETROLIERE. *Rapport annuel 2009* (online). Zurich, 2010, p.47 http://www.erdoel-vereinigung.ch/UserContent/Shop/JB_2009_FR.pdf (viewed on 27.06.2012)

⁶¹ Printemps arabe : la chronologie par pays. *Scienceshumaines.com* (online). 29.08.2011 chap.1 Tunisie http://www.scienceshumaines.com/printemps-arabe-la-chronologie-pays-par-pays_fr_27710.html (viewed on 08.07.2012)

⁶² Printemps arabe : la chronologie par pays. *Scienceshumaines.com* (online). 29.08.2011 chap.4 Libye http://www.scienceshumaines.com/printemps-arabe-la-chronologie-pays-par-pays_fr_27710.html (viewed on 08.07.2012)

⁶³ MISEREZ Marc-André. La mort de Kadhafi soulage tout le monde. *SWISSINFO.ch* (online). 21.10.2011. http://www.swissinfo.ch/fre/dossiers/le_printemps_arabe/La_mort_de_Kadhafi_soulage_tout_le_monde.html?cid=31399422 (viewed on 11.07.2012)

However, this period did not come without price for Libya's economy. As oil wells were burned and important refineries and transit ports became battlegrounds, the oil output, the country's main source of revenue, was effectively cut-off⁶⁴ during several months.



Smoke rising from the town of Mersa Brega, location of the second biggest hydro-carbon complex in Libya, during the spring of 2011. Source: Fox News

To counter this and fearing the arising tightening of the oil market in a weakened global economy (crisis of 2008), in June 2011⁶⁵, the countries member of the International Energy Agency agreed to release 60 million barrels more the following month. As a direct result of this disruption, Libya's economy contracted by 41.8% in 2011.

In Switzerland, the war in Libya was one determining factor in speeding the bankruptcy of the Petroplus group. It engineered an increase in oil prices between two and three dollars⁶⁶ a barrel between June and December 2011. Interviewed by Le Temps newspaper, Martin Schreiber, BCZ analyst, described the then ongoing situation: " For Petroplus, this creates an increase in purchase costs between 30 and 50 millions USD each month, coupled with a sharp lowering of its margins." Add to this uneasy situation

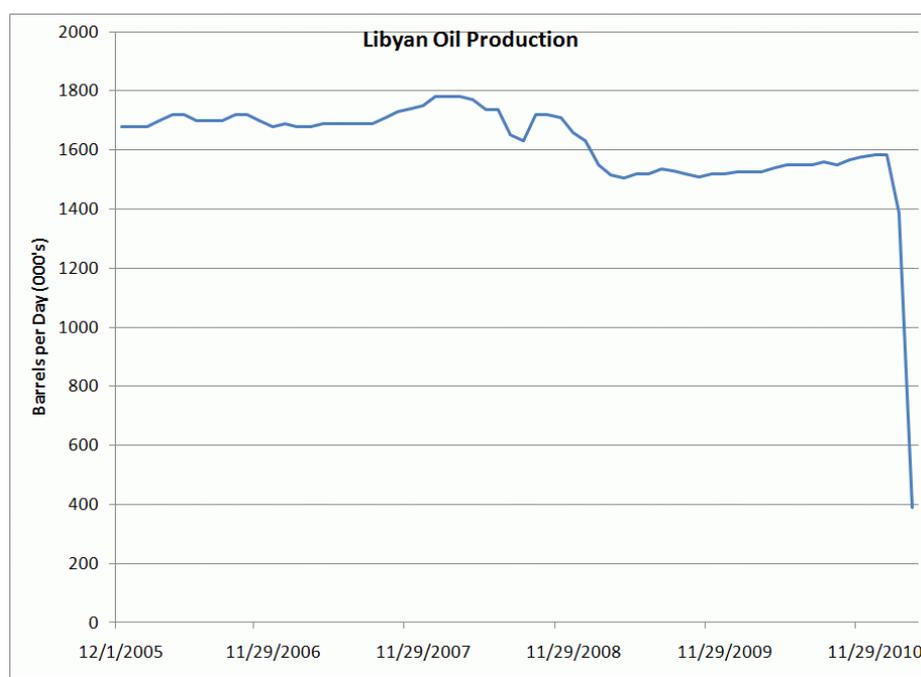
⁶⁴ AFRICAN ECONOMIC OUTLOOK. *Libya 2012* annual report (online), 2012, p.1 <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Libya%20Full%20PDF%20Country%20Note.pdf> (viewed on 04.07.2012)

⁶⁵ IEA makes 60 million barrels of oil available to market to offset Libyan disruption. *IEA.org* (online) http://www.iea.org/press/pressdetail.asp?PRESS_REL_ID=418 (viewed on 20.07.2012)

⁶⁶ ESKENAZI Daniel, Cinq ans après son entrée en bourse, Petroplus lutte pour sa survie. *LE TEMPS* (online) 09.12.2012 <http://www.letemps.ch/Page/Uuid/82ea1436-21da-11e1-a9c4-2990331a3f5c%7C0> (viewed on 10.08.2012)

2.1 billion CHF in debt and the survival of the company seemed already compromised as early as the end of the summer 2011. Since then, and as mentioned previously, Cressier has been recently bought and brought back to operational status by Varo Energy holding, a subsidiary of the Vitol trading company⁶⁷.

Disruption of Libyan oil production in 2011:



Source: Bloomberg 2012

This graph illustrates the consequences of the civil war of 2011 on Libyan oil production, and therefore its entire economy: a massive crash with an output divided by four. To sum up, the disruption of oil production caused by the war is another factor that explained the dramatic drop (down to 4,5% in 2010) in Libyan oil exports to Switzerland and the switch to other suppliers.

⁶⁷ Les 270 employés de la raffinerie de Cressier bientôt au travail. *Radio Télévision Suisse RTS INFO* (online).04.07.2012. <http://www.rts.ch/info/regions/neuchatel/4114944-les-270-employes-de-la-raffinerie-de-cressier-bientot-au-travail.html> (viewed on 12.07.2012)

3.4. The shift to Azeri and Kazakh crude oil

The embargo declared by Muhammad Kaddafi on crude exports to Switzerland marked the beginning of the shift in supplies between Libya and former Soviet bloc countries of Central Asia, namely Kazakhstan and Azerbaijan.

“The 2008 embargo was kind of a childish and stupid reaction by the Libyan regime. We live in an open market, if they cut the supplies, other providers will present themselves naturally. For me, the Libyans were just shooting themselves in the foot by denying an important client.” (Ludwig Hachfeld, SOCAR Trading project director)

These countries possess a **very similar quality** crude as the Libyan light sweet one and were offering something the Libyans were now denying to Switzerland: “security of supplies” as SOCAR Trading project director Ludwig Hachfeld qualifies it.

On a logistical level, this meant that the Azeri had to carry their oil to the two Mediterranean terminals feeding the two Swiss refineries, Fos-sur-Mer and Genoa.

Azeri crude oil logistical routes:



Source: TURKISH NEWS.com, *The rise of Azerbaijan*, 08.12.2009

This was mainly achieved by transferring crude through the BTC (Baku-Tbilisi-Ceyhan) pipeline from Azerbaijan to the Mediterranean terminal of Ceyhan in Turkey. Although they are two other main Azeri pipelines, they are reaching terminals in the Black Sea and are adding the fiscal strain of having to pass an oil tanker through the Bosphorus between Turkey and Greece to reach the Mediterranean.

“The Azeri also want to avoid as much as possible transferring oil through Russia.”
(Philippe Evrard, former TOTAL crude oil trading manager West Africa).

Thus Tamoil refinery, a Libyan owned company, had to process crude that was not originating from its parent country. The fact is, Tamoil is not Libya National oil company, even if the enterprise is a Libyan property. This kind of company is usually obliged, by decree, to use their own national oil.

“A refinery is made to process crude oil. It does not care about the oil passport.”
(Ludwig Hachfeld, SOCAR Trading project director)

Kazakhstan is now the most important exporter of crude to Switzerland with a 50,7 % share in 2011.

“I am a bit surprised that the share of Kazakh oil within Switzerland rose to such a degree, as this oil has the nasty particularity to be rich in mercaptans, gas which smell like rotten eggs when the oil is refined. They can be corrosive too”. (Ludwig Hachfeld, SOCAR Trading project director)

To sum up, Libya used to be a very important exporter of crude to Switzerland, but two diplomatic and geo-political crisis completely changed the situation. The Libyan embargo of 2008 marked the start of shift in oil crude origin for Switzerland: mainly from the African continent, with a peak of 80.4% in 2008, (highlighted in blue) to former Soviet countries from Central Asia, with a peak of 64.9% in 2010. Africa represented by 2011 only 31.5% of crude oil imports by the confederation. Algeria, not Libya, is now the main African provider of crude to Switzerland with a 17.9% part in 2011.

“By refusing to acquire the Petit-Couronne refinery in France, the Libyans showed that they have no clear refining strategy.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa).

3.5. Summary

- Libya used to be the main exporter of crude oil to Switzerland. It had the advantage of proximity with Switzerland and easy access to Mediterranean terminals and of a high quality light sweet crude.
- The diplomatic crisis of 2008 between Switzerland and Libya and the resulting embargo spurred a major shift in Swiss crude oil supplies from Libya to former Soviet bloc nations: Azerbaijan and Kazakhstan, both producers of a very similar quality crude.
- Tamoil, even if owned by the Libyan government, had no trouble dealing with crude originating from other countries as it is not a national oil company, like SOCAR for Azerbaijan.
- The Libyan civil war of 2011, in the wake of the Arab Spring, further deteriorated the part of Libyan crude to Switzerland by disabling national production. The rise in oil prices it fueled contributed to speed Petroplus bankruptcy.
- Even if Libya used to be an important oil partner for the confederation, both countries live in an open and liberal economy, so its real influence on the Swiss market is limited, even through major crisis.

4. The potential future of Swiss refineries

4.1. The acquisition of Cressier by the Vitol group

As previously stated in this work, the Cressier facility has been acquired by Varo Energy holding, a subsidiary of the Vitol trading company. This is a surprising move, as small refineries are not judged economically sound.

“They (Vitol) made, according to me, a bad investment when buying back Cressier.”
(Ludwig Hachfeld, SOCAR Trading project director)

Even more so because refining facilities are situated completely downstream on the supply chain, whereas trading companies are usually in the position of middle-man. This situation is described by Ian Taylor, Vitol Group chief executive, in an interview with the Financial Times⁶⁸: “ We see two big trends on the market: one, the **oil majors** moving upstream to become very serious project developers, but mainly upstream. They are **not so interested in the downstream**. For very good reasons: it has **not made a lot of money**. But in the end of the day, somebody needs to deliver the oil, that we all use in our homes, to the downstream and consumers. I think there is an increasing desire in the trading houses to increase their flows all the way through the (supply and trading) chain. “

4.1.a Why is a trading house investing on downstream assets like a refinery?

“Vitol’s only objective is to make money.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa).

The objectives of a commodity trading house is to make profits on transactions by, to simplify, “paying producers more than end users can while selling commodities more

⁶⁸ FINANCIAL TIMES. *Vitol :oil prices stubborn short-term*. Interview of Ian Taylor by Javier Blas, FT’s commodity editor.(online)23.04.2012. <http://video.ft.com/v/1579338578001/Vitol-Oil-price-stubborn-short-term> (viewed on 14.02.2012)

cheaply to end consumers than producers can afford.”⁶⁹ They can do that by “managing a range of options relating to the time, location, quality, quantity, sourcing and delivery logistics of their cargoes”: this is called **optionality**. Most trading houses are making their profit by smoothing out imbalances between supply and demand.

Optionality is the main reason behind Vitol’s acquisition of Cressier, in order to give them more leverage, more options along their supply/trading chain to obtain better profits than just pure FOB-CIF crude oil cargo trading. However this operation is raising new risks and issues for the company.

Traders are making larger investments in logistical assets to capture additional “optionality”

REFINERY	
OPTIONALITY	✓
QUALITY	✗
LOCATION	✗
TIME	✗
LOT SIZE	✓
MINIMUM INVESTMENT	~\$500+ million (for ~100,000 barrels per day)
REQUIREMENTS	Capital <ul style="list-style-type: none"> Secure a large amount of long-term capital Operations <ul style="list-style-type: none"> Ability to manage technically complex facility Manage price differentials between input and output product mix

We can see on this table that to own a refinery and as previously stated, very **large investments are necessary**. This would explain the part of AtlasInvest, a private investment group, in the Varo Energy Holding as a way to secure a large amount of long-term capital. However for the proper acquisition of the Cressier facility, Vitol most certainly spent very little as its previous owner was bankrupt and it showed little possibility for viable profit making.

Source: OLIVER WYMAN, *The dawn of a new order in commodity trading*. 2012 p.8

⁶⁹OLIVER WYMAN.com, *The dawn of a new order in commodity trading*(online).2012. http://www.oliverwyman.com/media/The_dawn_of_a_new_order_in_commodity_trading.pdf p.1&2 (viewed on 17.02.2013)

“Compared with a pure trading model where a company’s capital is essentially tied up in short term positions, moving into assets provides **optionality** but requires a longer-term commitment of capital with associated implications for the financing strategy for the business as a whole,” explains Chris Jones, Deloitte leader for Energy and Resources⁷⁰.

“Vitol purchased Cressier for nothing, considering what they have to invest to make it economically sound.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa)

Vitol will have to manage a technically complex facility and find qualified workforce and technicians to operate it. This is indispensable as deficiencies in the plant operations can lead to new kind of risk for a trading house such as Vitol: industrial accidents being the most severe. The explosion of the plant like the one of march 23rd 2005 in Texas City⁷¹ is a real possibility and costly measures have to be taken by the new management. As **risk management** is one of the mainstays of the commodity trading sector, this new trend is adding more variables to the equation.

“As Cressier has a very low complexity in comparison to most new refining plants, this risk is downsized, but still existing. Concerning the operational workforce, that should not really be an issue as they just have to get back Petroplus former employees.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa)

4.1.b Is this new trend for commodity trading houses foretelling a better future for the Swiss refineries?

“The question is **can we make money out of it?** Which is a **very difficult one to answer.**” (Ian Taylor, Vitol Group chief executive)

As Ian Taylor said, the profitability of this operation is difficult to assess, and other experts do not consider Vitol acquisition as a viable operation on the long term.

⁷⁰ COMMODITIES NOW. *New era in global energy and commodity trading*(online).11.02.2013 <http://www.commodities-now.com/reports/general/13820--new-era-in-global-energy-and-commodity-trading.html> (viewed on 17.02.2013)

⁷¹ POPULAR MECHANICS. *What went wrong :oil refinery disaster*(online).14.09.2005 <http://www.popularmechanics.com/technology/gadgets/news/1758242> (viewed on 17.02.2013)

“ I really do not see how they can reverse the trend for the Swiss facilities. If they invest massively in those installations, they will never see their money back as refining margins, even a bit improved by the investments, will never be enough. Optionality is good and all, but I do not see it. However, Vitol is the most successful trading house in the world, if someone can pull it out, it may be them.” (Ludwig Hachfeld, SOCAR Trading project director)

“I think that as soon as they realize that they cannot make any more money out of it, Vitol is just going to ditch the whole Cressier plant.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa)

“In any case, I do not see the light at the end of the tunnel for Vitol’s Cressier operation. For me they are doing the same mistakes as Petroplus.” (Ludwig Hachfeld, SOCAR Trading project director)

4.2. The hypothesis of survival

Taxation system switch: a solution to European structural overcapacity?

We saw earlier in this work that Europe suffers from a structural refining overcapacity and that their production is in total imbalance with European consumption, which favors diesel when they are producing more gasoline. Most recently (march 2013), the French government has put into question the subsidies⁷² accorded to diesel fuel as a potential source of income. The health issue over the recent World Health Organization statement that diesel fumes are a proven carcinogenic is another motivation for the French. With an 80% part, diesel is the fuel most favored by French consumers mainly because it is cheaper than gasoline as a result of this subsidies. If this political decision is put into place, the impact would be of huge importance for the refining sector, and the car manufacturing industry. Nothing is stopping other European Union countries to follow the French example.

“France is running on diesel, but the French favors small, inexpensive cars. If the diesel is not cheaper anymore, they will just revert back to gasoline.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa)

A global European shift to gasoline would bring back the refining industry of the continent into balance, helped by the fact that the most vulnerable facilities would have closed down before the shift has effectively took effect.

⁷² DOUET, Marion. Taxer le diesel, l'espoir des raffineries françaises.
REUTERS(online).05.03.2013 <http://fr.news.yahoo.com/taxer-le-diesel-lespoir-des-raffineries-françaises-115331411--finance.html> (viewed on 08.03.2013)

4.3. Closures and storage reconversions

We saw earlier in this work that the Swiss refineries are likely to close down on a short-midterm period. In this case, the logical step would be for them to be dismantled, to sell the few valuable refining units to potential customers and to **keep their crude oil storage** units and convert them into refined products tanks. This is what happened to the Petroplus Coryton refinery in the United-kingdom⁷³. In keeping with the law obligated “mandatory reserves”, this would actually make sense in the actual market.

“If the refinery is not viable anymore, you can just close it down and keep or expand the storage units for the strategic reserves. Even more, transforming their crude oil pipelines into refined products pipelines should not be an issue.” (Philippe Evrard, former TOTAL crude oil trading manager West Africa)

“The Coryton case seems to be the most likely scenario. If the market is in contango, it is good to have storage units in close proximity to your customers, as would be the case if it is all that is left of the Swiss refineries after their closures.” (Ludwig Hachfeld, SOCAR Trading project director)

However, as Philippe Evrard describes it: “a refiner shutting down its plant will be left with a poison pill”. Indeed, the **decontamination bill** of the terrain where such facilities were implanted are tremendous and is one of the main reason why Tamoil has not shut its Collombey refinery yet. Even so, Tamoil is under constant pressure by the Valais government⁷⁴ to sanitize its plant and upgrade it to Swiss environmental norms. As an answer, Tamoil has waged the closure threat as leverage against the authorities which are still concerned about the 220 jobs a closure would destroy.

⁷³ROZHNOV, Konstantin. Coryton refinery near closure. *THE WALL STREET JOURNAL*(online). 28.05.2012 <http://www.marketwatch.com/story/coryton-refinery-nears-closure-2012-05-28> (viewed on 01.03.2013)

⁷⁴ PARVEX, Marie. Tamoil : menaces de fermeture. *LE TEMPS*, 22.01.2013. p.8 (viewed on 23.01.2013)

4.4. Summary

- Two trends are affecting the refining sector: the major oil companies deserting it in favor of upstream activities, and former middle-man trading houses or Investment funds moving on it.
- Trading houses are buying downstream assets such as refinery to obtain more optionality on their whole supply/trading chain, i.e. more options to acquire better profits while trading.
- However this trend requires heavy investments and secure long-term capital through loans or association with investments funds, like the case of Varo Energy holding.
- It also includes new type of risks for a trading company, such as industrial accident or managerial risks.
- The profitability of such strategy is not yet assured. As Ian Taylor, Vitol Group chief executive sums up: “The question is can we make money out of it? Which is a very difficult one to answer.”
- The potential cancelling of major European countries tax system promoting diesel, such as France, may be an opportunity to get the European refining sector to balance itself again and thus save the Swiss facilities.
- The most likely scenario for the Swiss refineries is the closure of both on the short-middle term and a reconversion of their crude oil storage units into refined products tanks.
- The main restraint to Swiss refinery closure is the potential cost of decontamination of the soils in a country with very strict environmental laws.

Conclusion

Through this work, we showed that the Swiss refineries were located in a sector in deep crisis: the European refining industry suffers from structural overcapacity and would require massive investments to be modernized. The Swiss facilities are extremely vulnerable: they are very small, very simple in their complexity and thus cannot rely on economies of scale to balance the low margins of their productions. Even the Swiss federal government does not consider them as strategic assets. They do not fit in the new rule of the global oil refining industry: "Bigger is better".

Libya has been determined as a once important supplier of crude to Switzerland. Trade between the two countries has crumbled as a result of an embargo and a civil war. Even so, this embargo was a total failure, as Switzerland was able with no particular problem to supply itself with other countries' crude of similar quality to the Libyan oil. Even if it basically owns, through the Tamoil Group, one of the two Swiss refineries, Tamoil is not Libya's national oil company. It had therefore no problem supplying itself with other light sweet oil from different origins. After representing 73% of Swiss crude oil imports in 2008, Libya was reduced to a meager 4.5% in 2011, mainly because of the civil war disruption. This situation does not mean however that Libyan crude will not be an important share of the Swiss crude oil imports again, as Ludwig Hachweld puts it: "Their future importance in imports shares will mainly be determined by market prices."

The acquisition of Cressier by Varo Energy illustrates a shift in trading house policy: they invest now more and more in upstream and downstream assets. This trend is the result of traders who will have access to better "optionality" all along their trade/supply chain. However the economical viability of such a move in the case of a small European refinery is very doubtful, as the potential return on investment seems dubious. The most likely future for the Swiss refineries is a short/mid-term closure and their reconversion in storage facilities for refined products. They are too small, too old, too simple to be of any value in the long term.

In any case, the coming years are looking dark for the Swiss refining industry, but their salvation might come from an unlikely neighbor: France and its interrogation on the continuity of a diesel promoting tax system...

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Annex 1

Weight of the Swiss refineries in oil supply (French)



Poids des raffineries suisses dans l'approvisionnement en pétrole

Approvisionnement de la Suisse

En 2010, les ventes suisses d'huiles minérales transformées avoisinaient les 11,3 millions de tonnes. 60 % étaient importées comme produits raffinés et 40 % étaient produites par nos deux raffineries à Cressier (NE) et Collombey (VS). Celle de Collombey a fourni quelque 2,4 millions de tonnes et celle de Cressier 2,5 en 2010. Si l'une des raffineries devait fermer, il faudrait importer l'équivalent de sa production.

Capacités de raffinage suffisantes

La fermeture de plusieurs raffineries européennes (notamment à Cremona et Reichstett) montre clairement qu'il y a des surcapacités de raffinage en Europe. Pour compenser les pertes dues à la fermeture d'une voire de ses deux raffineries, la Suisse pourrait importer suffisamment de produits raffinés de l'espace européen.

Diverses voies d'acheminement

En 2010, les produits raffinés ont été acheminés en Suisse par le rail (42 %), par le Rhin (40 %), par le pipeline SAPPRO¹ Marseille-Genève (9,5 %) et par la route (8,5 %). Tant le pipeline de la SAPPRO que le trafic rhénan ont des capacités inutilisées. Grâce à elles, la Suisse pourrait en principe compenser la fermeture de ses deux raffineries en accroissant ses importations de produits raffinés.

Annexe :

schéma « importations d'huiles minérales en 2010 ventilées par origine et poste frontière »

Annex 2

Nelson complexity index

Nelson's Complexity Factor

In the Refining Industry, a common index termed as "EDC" - Equivalent Distillation Capacity is defined to calculate the benchmark of manpower requirement.

Calculation of EDC is a two-step process. The first step is the multiplication of the capacity of each unit in the refinery with the Nelson's complexity factor and the second is the sum of these products to arrive at the EDC for the refinery in total.

Nelson Complexity Index

Nelson Complexity Index is a measure of secondary conversion capacity in comparison to the primary distillation capacity of any refinery. It is an indicator of not only the investment intensity or cost index of the refinery but also the value addition potential of a refinery.

The index was developed by Wilbur L Nelson in 1960 to originally quantify the relative costs of the components that constitute the refinery. Nelson assigned a factor of one to the primary distillation unit. All other units are rated in terms of their costs relative to the primary distillation unit also known as the atmospheric distillation unit.

Following are the factors for the various Processing Units :

Unit	Nelson's Complexity Index	
	Older Reports	1998 Reports
Distillation Capacity	1.0	1.0
Vacuum Distillation	2.0	2.0
Thermal Processes	5.0	2.75
(Categories 1 and 2 - 2.75)		
(Categories 3 to 5 - 6.00)		
Coking		6.0
Catalytic Cracking	6.0	6.0
Catalytic Reforming	5.0	5.0
Catalytic Hydrocracking	6.0	6.0
Catalytic Hydrotreating	3.0	3.0
Alkylation / Polymerization	10.0	10.0
Aromatics / Isomerisation	15.0	15.0
Lubes	60.0	60.0
Asphalt	1.5	1.5
Hydrogen (Mcf)	1.0	1.0
Oxygenates	10.0	10.0

(MTBE / TAME)

Thermal Operations

Thermal Cracking	3.0
Visbreaking	2.5 6.0
Fluid Coking	6.0 6.0

Delayed Coking

Others

The Nelson Complexity Index method uses only the Refinery Processing Units or the " Inside Battery Limits " (ISBL) Units, and does not account for the costs of Off-sites and Utilities or the " Outside Battery Limits " (OSBL) Costs, such as Land, Storage tanks, terminals, utilities required etc.

The Nelson Complexity Index provides insight into refinery complexity, replacement costs and the relative value addition ability and allows different refineries to be ranked.

The Nelson Complexity Index for the Reliance refinery is 9.93 and for the overall Jamnagar Complex is over 14.0.

Essentially a high Nelson Complexity Index as the Reliance Jamnagar Refinery is, points to the following characteristics .



- Ability to process inferior quality crude or heavy sour crudes. For example the Jamnagar Refinery generally processes crudes which are 5°API lower and 0.7wt% sulphur higher compared to Indian peers.
- Ability to have a superior refinery product slate comprising of high percentage of LPG, light distillates and middle distillates and low percentage of heavies and fuel oil. For example the Jamnagar Refinery produces no fuel oil which is unmatched by the Indian peers.
- Ability to make high quality refinery products such as Bharat 3 gasoline or diesel. For example the Jamnagar Refinery can make Euro 3 grade gasoline unmatched by the Indian peers.

Annex 3

Interviews questions

- What is your opinion on the situation of the two Swiss refineries? And in the rest of Europe?
- Do they make sense to you?
- Was the diplomatic crisis with Libya the main drive for Swiss imports shift to other crude? Were there other factors?
- What do you think caused Petroplus bankruptcy?
- Cressier refinery is owned by the Vitol Group now. What do you make of it?
- Are there additional risks in operating a refinery for a trading house?
- What do you think about Libya's influence on the Swiss oil market?
- What is your opinion on the potential future of Swiss refineries?
- Do you think Libya will ever get the same importance again?