ESMAP
Energy Sector Management Assistance Program

WORLD BANK

Petroleum Product Markets in Sub-Saharan Africa

Comparative Efficiency Analysis of 12 Countries

2009

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Abbreviations

CIF	cost, insurance, and freight
DH	Direction des Hydrocarbures (Côte d'Ivoire)
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
FOB	free on board
GDP	gross domestic product
HHI	Herfindahl-Hirschman index
KPRL	Kenya Petroleum Refineries Limited
LPG	liquefied petroleum gas
m^3	cubic meters
MEMD	Ministry of Energy and Mineral Development (Uganda)
MER	market exchange rate
MERA	Malawi Energy Regulatory Authority
OMC	oil marketing company
PETROCI	Société Nationale d'Operations Pétrolières (Côte d'Ivoire)
PPP	purchasing power parity
SAR	Société Africaine de Raffinage (Senegal)
SIR	Société Ivoirienne de Raffinage (Côte d'Ivoire)
SONABHY	Société Nationale Burkinabè d'Hydrocarbures (Burkina Faso)
SONIDEP	Société Nigérienne de Dépôt d'Essence et de Pétrole (Niger)

All dollar amounts are U.S. dollars unless otherwise indicated.

Acknowledgment

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Executive Summary

Petroleum products are used across the entire economy in every country. Gasoline and diesel are the primary fuels used in road transport. Oil is used in power generation, accounting for 11 percent of total electricity generated in Africa in 2007. Adequate and reliable supply of transport services and electricity in turn are essential for economic development. Households use a variety of petroleum products: kerosene is used for lighting, cooking, and heating; liquefied petroleum gas for cooking and heating; and gasoline and diesel for private vehicles as well as captive power generation.

Prices users pay for these petroleum products have macroeconomic and microeconomic consequences. At the macroeconomic level, oil price levels can affect the balance of payments, gross domestic product (GDP), and, where fuel prices are subsidized, government budgets, contingent liabilities, or both. At the microeconomic level, higher oil prices lower effective household income in three ways. First, households pay more for petroleum products they consume directly. Seventy percent of Sub-Saharan Africans are not yet connected to electricity; most without access rely on kerosene for lighting. Second, higher oil prices increase the prices of all other goods that have oil as an intermediate input. The most significant among them for the poor in low-income countries is food, on which the poor spend a disproportionately high share of total household expenditures. Food prices increase because of higher transport costs and higher prices of such inputs to agriculture as fertilizers and diesel used for operating tractors and irrigation pumps. For the urban poor that use public transport, higher transport costs also decrease their effective income. Third, to the extent that higher oil prices lower GDP growth, household income is reduced.

Factors Affecting Costs of Supplying Petroleum Products

World oil prices increased fourfold between January 2004 and July 2008 and, after a sharp drop in the latter half of 2008, have been rising again. All sectors of the economy can benefit from an efficiently managed downstream oil sector that delivers petroleum products in the quantity and at the quality required at least cost. For a given price of a petroleum product on the world market, end-user prices net of taxes are affected by a number of factors:

- Market size and economies of scale
- Mode of product transport—in terms of cost per liter of fuel transported over land, the least expensive is pipeline transport (in a handful of cases in Sub-Saharan Africa that have the requisite scale economy), followed by rail, and finally by trucks
- Liberalized versus controlled pricing
- Protection given to inefficient domestic suppliers
- Degree of competition
- Clear and stable legal framework with effective monitoring and enforcement
- Regular disclosure of industry statistics

Study Description

This regional study takes 12 oil-importing countries in Sub-Saharan Africa and asks the following two questions:

- Does each stage in the supply chain, from import of crude oil or refined products to retail, seem to be efficiently run *and* are the efficiency gains passed on to end-users?
- If not, what are the potential causes and possible means of remedying the problems?

The study selected Burkina Faso, Côte d'Ivoire, Mali, Niger, and Senegal in West Africa and Botswana, Kenya, Madagascar, Malawi, South Africa, Tanzania, and Uganda in East and Southern Africa, covering a wide range of conditions that affect price levels, such as market size, geography (whether landlocked or coastal), existence of domestic refineries, the degree of sector liberalization including pricing, and the level of economic development.

The study relied on information collected during country visits by two consultants lasting an average of two days in each country (except Botswana and Malawi for which information was collected through telephone calls and email) and publicly available information. The visits to the countries in East and Southern Africa took place in November 2008 and those in West Africa in January 2009. The short duration of each visit necessarily restricted the amount of information that could be collected, and the findings of this study and its recommendations should be interpreted in the light of these data limitations.

Infrastructure and Market Structure

The markets covered in this study are small, with all but three having annual domestic consumption of less than 25,000 barrels a day (Table E.1). Against a world-scale refinery size of at least 100,000 barrels a day, only three out of seven petroleum refineries in the study countries are world-scale refineries in size and complexity, all in South Africa. In addition to the capacity shown in the table, South Africa also has an equivalent of 200,000 daily oil barrels of coal-to-liquids and gas-to-liquids plants, producing high-quality diesel and other liquid fuels. The refinery in Côte d'Ivoire is relatively small but has a cracking unit capable of making good-quality diesel. It is protected with a 5-percent premium over the import-parity cost. The refineries in Kenya and Senegal are not economic; the one in Senegal is much too small, and that in Kenya has no cracking facility and is in need of rehabilitation. The Kenyan refinery has frequently suffered from water shortages and power outages, reducing product output and causing shortages in the region.

Table E.1 Study Coverage of Sub-Saharan African Countries

	West Africa				
Characteristics	Burkina Faso	Côte d'Ivoire	Mali	Niger	Senegal
2008 Population, million	15.2	20.6	12.7	14.7	12.2
2008 GDP pc, MER	523	1,137	688	365	1,082
Geographical and oil supply features	Landlocked	Coastal/ transit	Landlocked	Landlocked	Coastal/ transit
2007 Petroleum product consumption, daily barrels	10,200	17,800	12,900	3,600	32,200
Refining capacity, daily barrels	0	64,000	0	0	25,000
HHI	1,963	1,544	915	2,959	2,445

East and Southern Africa							
Characteristics	Botswana	Kenya	Madag-ascar	Malawi	South Africa	Tanzania	Uganda
2008 Population, million	1.9	38.5	19.1	14.3	48.7	42.5	31.7
2008 GDP pc, MER, US$	6,808	895	469	299	5,685	482	459
Geographical and oil supply features	Land locked	Coastal/ transit	Island	Land-locked	Coastal/ transit	Coastal/ transit	Land-locked
2007 Petroleum product consumption, daily barrels	15,600	67,000	11,500	6,000	445,700	22,300	14,500
Refining capacity, daily barrels	0	90,000	0	0	485,300	0	0
HHI	2,367	1,937	2,675	2,800	1,699	1,107	1,831

Source: World Bank 2009a, official government statistics and data from industry associations, *Oil and Gas Journal* 2008.
Notes: pc = per capita, MER = market exchange rate, HHI = Herfindahl-Hirschman index.

Market concentration, measured by the Herfindahl-Hirschman index (HHI), shows that the market in eight out of 12 countries is concentrated—HHI above 1,800 is generally considered concentrated, that less than 1,000 unconcentrated. Somewhat surprisingly, the least concentrated market is not South Africa, by far the largest market in the study, but Mali, with annual consumption of less than 15,000 barrels a day. The most concentrated market is Niger, closely followed by Malawi and Madagascar.

Maximum tanker sizes that can be accommodated at the primary ports for petroleum product imports are at the small end of scale economy at Abidjan and Vridi in Côte d'Ivoire and Cotonou in Benin for imports into Niger, but are good in other countries. The four smallest markets in the study—Niger, Malawi, Burkina Faso, and Madagascar—have all adopted what amounts to a single-buyer model, presumably to achieve economies of scale in fuel importation to the extent possible.

There are product pipelines only in Kenya and South Africa. The pipeline operation in Kenya has been frequently disrupted by power shortages. The project for extending the pipeline to Uganda has suffered from years of delay. The pipeline capacity in South Africa is currently constrained; there is a plan to build another multi-product pipeline. These limitations in the availability of operating pipeline capacity have increased costs of fuel supply. There are long-term prospects for a product pipeline in Côte d'Ivoire, Burkina Faso, and Mali.

Rail transport is generally under-utilized. The line connecting Senegal and Mali requires investment to improve its physical state and quality of service. In Malawi, Tanzania, and Uganda, the under-utilization is similarly due to the run-down state of the rail infrastructure. In Madagascar, the market-based rate for road movements is more than 50 percent higher than that using rail, yet only 28 percent was transported by rail and more than 70 percent by road in 2008. Madarail is in a position to transport 40 percent or more of the volume moved and achieve cost savings.

Road transport is hampered by poor road conditions, congestion, and, where cross-border trade is involved, slow border clearance in some situations. More effective enforcement of load limits across the road freight sector will benefit road transport in the long run by reducing road damage, enhancing traffic safety, and eventually enabling use of larger and more fuel-efficient trucks.

Although enforcing the three-axle rule in Tanzania and Kenya may have had short-term costs by reducing the amount of fuel that can be carried by each truck, long-term benefits—if accompanied by road improvement and other measures—should outweigh these costs.

Policies Affecting Fuel Prices

There is much greater government presence in the petroleum market in West Africa than in East and Southern Africa. In Burkina Faso, Côte d'Ivoire, and Niger, a state-owned monopoly entity procures all petroleum products, in the case of Côte d'Ivoire through both product imports and refining Nigerian crude oil. A monopoly supplier does not mean reduced efficiency—a recent benchmark audit of the state monopoly supplier in Burkina Faso found that the entity's procurement performance was close to best practice. Kenya has an Open Tender System whereby crude or petroleum products are purchased by a single company for the entire market on the basis of a public tender and shared among all marketing companies in proportion to their share of the market. Questions have been raised about the cost-effectiveness of this system.

Eight countries have price control, including all five West African countries. The eight countries use different variations of an import-parity structure with international spot reference prices, market marine freight rates, and the dollar-local currency exchange rates as the three key short-term adjustment parameters. With the exception of Malawi, the countries with price control adjust prices monthly. Malawi has a price stabilization fund and has no pre-set automatic adjustment frequency. The stabilization fund ran up a large deficit in 2008.

Only in Botswana, Senegal, and South Africa is the price adjustment consistently automatic, based on pre-established administrative procedures. Despite having a pre-established procedure, there is ad-hoc intervention in each adjustment in Burkina Faso, Côte d'Ivoire, Mali, and Niger. As world oil prices soared in 2007 and 2008, the four countries smoothed retail prices. Mali and Niger did so by reducing taxes, and Burkina Faso and Côte d'Ivoire by reducing prices charged by their state supply companies. As world prices fell sharply during the latter half of 2008, these countries kept retail prices relatively high to recover the losses suffered earlier when prices were kept artificially low.

Côte d'Ivoire, Madagascar, Mali, Niger, and Senegal have pan-territorial pricing, and Burkina Faso has two sets of uniform prices depending on location. Price uniformity is by government policy, with the exception of Madagascar where a private monopoly logistics operator provides a common ex-depot price for all depots in the country. Mali achieves uniform prices by tax differentiation, whereby petroleum products sourced in the least-cost manner are taxed more to achieve the same price throughout the country. This pricing policy provides little or no incentive to minimize costs.

Côte d'Ivoire, Kenya, and Senegal provide explicit protection to their refineries. Côte d'Ivoire does so by adding 5 percent to the import parity cost. The refinery in Senegal would need much greater protection; currently gasoline, kerosene, and diesel are levied a fee amounting to some $0.07 per liter to help amortize the debt owed by the refinery. The government of Kenya provides protection to the refinery by requiring marketers to process about half of local consumption at the refinery according to their market share. The required amount was 70 percent until February 2009, when the government lowered the requirement to 50 percent in light of continuing operational problems faced by the domestic refinery. South African refineries are protected indirectly by restrictions on product imports.

The status of the legal framework in the 12 countries is mixed. Burkina Faso, Côte d'Ivoire, Mali, and Niger need to strengthen their legal and regulatory frameworks. The four countries have not updated their legal framework in decades and rely on disparate texts from French colonial times. With the exception of Botswana and South Africa, the study countries suffer from weak monitoring and enforcement, even in those countries where a strong legal and institutional framework has been established. Where there may be too many small operators in the market, as in East Africa, the response should not be to limit the number of companies but to ensure that the licensing criteria for operators are stringent and that compliance with rules to obtain and retain the licence is enforced.

Information about the downstream sector—about prices and price structure, sources and volumes of imports, differences between domestic and international prices, companies operating in the country—is not readily available in many study countries. An important role of government is to collect and make market information available to inform both suppliers and purchasers. If the public is well informed, it becomes more difficult to ignore sector inefficiencies. The Energy and Water Utilities Regulatory Authority of Tanzania provides up-to-date detailed prices throughout the country twice a month on its Web site. Where there are charges of price collusion and pressure on government to re-introduce price control, as has happened in Kenya and Tanzania, it would be useful to have historical price information available to the public so that perceptions can be checked against actual price trends. Historical prices in countries where prices are not controlled require price surveys and can be resource-intensive to collect. But the government agency in charge of the sector can begin by collecting price information in the capital city and, in due course, extend data collection to other major cities.

Fuel shortages have had serious adverse effects on price levels in some parts of Sub-Saharan Africa. Among the study countries, landlocked Uganda in particular has repeatedly suffered from prolonged fuel shortages and price spikes—including the last three months of 2008 and the beginning of 2009 even as world oil prices fell sharply—due to disruptions in the supply chain from Kenya. Over the longer term, ensuring sufficient fuel stocks is an often-used mechanism to protect against supply disruptions. There is a large cost associated with establishing such stocks, and as a result even when there is a plan to establish security storage capacity the plan is not necessarily implemented for lack of financing. But there are also costs to the economy of fuel shortages. Assessing the costs and benefits of maintaining contingency stocks—and deciding how large, who maintains, and who pays—is important.

Governments of Burkina Faso, Côte d'Ivoire, Kenya, Mali, Niger, South Africa, and Tanzania have assigned agencies in charge of security stocks. Malawi's Minister of Natural Resources, Energy, and Environment recently announced the government's intention to establish a national oil company aimed at ensuring the security of supply of petroleum products. Senegal has a 1998 decree fixing the modalities for maintaining security stocks. Botswana sub-contracts maintenance of contingency stocks to two oil marketing companies. The government of Uganda announced a plan in early 2009 to build a fuel depot in Kampala with a capacity of 150 million liters (about 1 million barrels).

Storage capacity at major consuming centers is generally adequate except in Malawi and Uganda. Uganda has storage capacity equivalent to about 20 days, and that in Malawi is even more limited. Given the frequent supply disruptions landlocked Uganda has experienced in recent years, greater storage capacity would be needed to protect the market against unanticipated supply shortages in the future.

Gasoline and Diesel Price Levels in December 2008

Figure E.1 shows retail gasoline and diesel prices in December 2008. Prices are broken down into

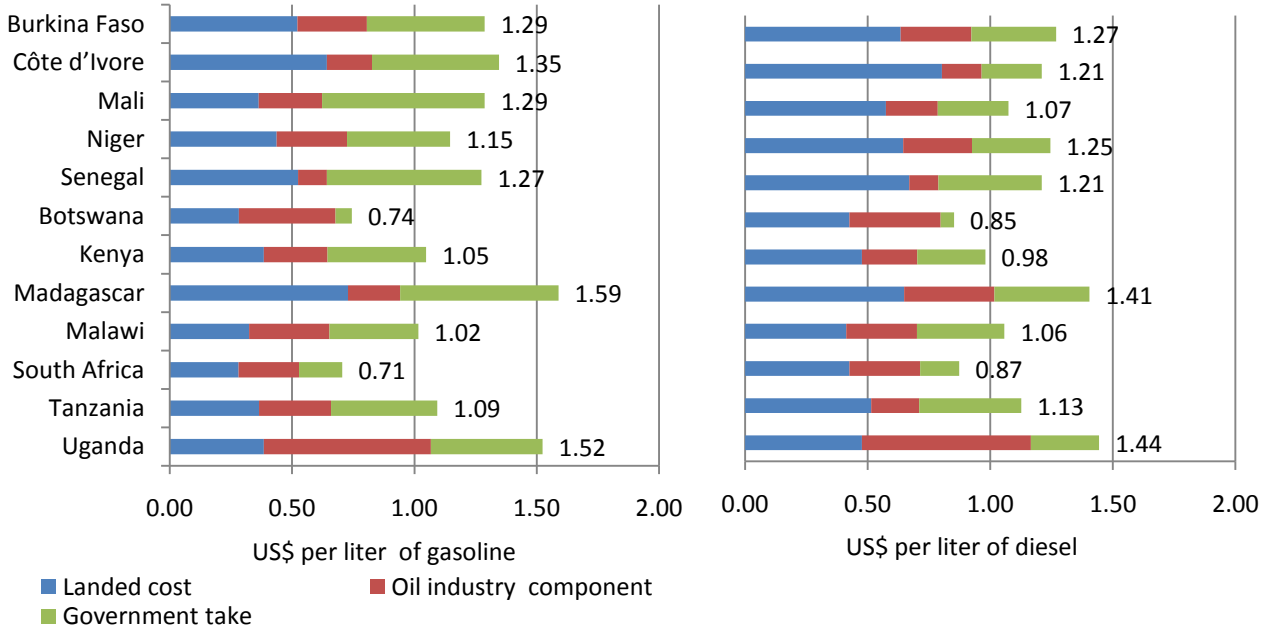
1. landed cost *or*, in countries with price control, hypothetical import-parity price corresponding to the landed cost used to calculate retail prices;
2. oil industry component, which covers all gross margins for storage, inland bulk transport, local delivery, wholesale, and retail distribution; and
3. government take, which includes all taxes, duties, and government fees.

The difference between the retail price and the sum of the landed cost and government take represents the gross margin component available to the downstream petroleum industry. In markets where prices are liberalized, this number is derived by difference and is the least accurate of the three components.

The landed costs of gasoline at the primary coastal supply points ranged nearly threefold and of diesel twofold. The high landed costs in Burkina Faso and Côte d'Ivoire are in part due to price stabilization strategies that kept these values artificially high to recover losses suffered earlier.

Total government take varied nearly tenfold across countries for gasoline and eight-fold for diesel. Taxes on petroleum products are a critical source of government revenue for low-income countries because taxing fuel is one of the easiest ways to get revenue: collecting fuel taxes is relatively straightforward, and the consumption of fuels as a group is relatively price inelastic and income elastic, ensuring buoyant revenue as income rises and tax rates are increased.

Figure E.1 Retail Gasoline and Diesel Prices in December 2008



Sources: Government regulatory authorities, World Bank consultant interviews with government and industry representatives, and consultant estimates.

Because the oil industry component is a residual value obtained by subtracting a sum of two estimated numbers from the retail price, it is the least accurate of the three components and hence comparison across countries should be treated with caution. Uganda's totals of 68 to 69

U.S. cents a liter stand out; they are almost double the next highest country. A higher industry component in a landlocked country compared with a coastal one is expected because of higher transport costs, but the values for Uganda are much higher than those in other landlocked countries under study. Uganda experienced fuel shortages in November and December of 2008 and this in part accounts for the high value of this component.

An analysis and comparison of net-of-tax retail prices (sum of landed costs and oil industry component) would normally be one of the first approaches to comparing basic cost structures across countries. Because many events can affect the net-of-tax prices, observations that can be gleaned from a snapshot of price information at one point in time are limited. For both fuels, Madagascar and Uganda have the highest net-of-tax prices, followed by Côte d'Ivoire. South Africa at $0.53 a liter has the lowest cost structure for gasoline. For diesel, Kenya, Malawi, South Africa, and Tanzania are comparable at $0.70–0.71 a liter. At $0.64 a liter, Senegal has a gasoline cost structure slightly higher than Mali's at $0.62 a liter, while its net-of-tax diesel price is identical to that in Mali. As a coastal country, its net-of-tax price can be lower; the relatively high net-of-tax price in Senegal can be partially explained by the special fee of $0.07 a liter charged to amortize the refinery debt.

Scope for Reducing Costs

There are varying degrees of scope for reducing the cost of supplying petroleum products in the study countries. A clear burden on the economy is protection of domestic refineries that cannot compete with direct product imports. Refinery closure is often politically sensitive, especially if the refinery is government-owned, but Madagascar and Tanzania have closed their refineries. Globally, the trend over the past three decades has been phasing out of numerous small, simple refineries in favor of fewer, larger, and more complex ones.

Pipelines are most cost-effective but require large upfront capital investments, a reliable supply of electricity—unreliable and inadequate power is among the most serious problems in the energy sector in Sub-Saharan Africa—and regular maintenance. While challenging, shifting to pipeline transport over the long term will reduce costs in many countries.

Greater use can be made of rail to reduce costs. This requires rehabilitation and expansion of existing lines in some cases. One obstacle to greater rail use is ownership of trucking business by oil marketing companies, particularly in West Africa. In the near term, Madagascar is perhaps best positioned to expand the share of petroleum products moved by rail, since there is spare capacity that can be readily mobilized.

Universal overloading of vehicles and poor road and vehicle conditions go hand in hand. They deter professional fleet management committed to safety and on-time delivery, and use of longer and more fuel-efficient modern trucks capable of carrying as much as 60 tonnes used in Europe and elsewhere; these large modern trucks require much better road surfaces. Coordination with other sectors to gradually improve road conditions and vehicle technology can reduce costs over the long run.

Assessment of procurement procedures such as the Open Tender System in Kenya; port clearance procedures, particularly in Tanzania; and performance by monopoly suppliers in Burkina Faso, Côte d'Ivoire, Madagascar, and Niger may find alternatives procedures and approaches that are less costly. Where price control is in effect, identifying aspects that reduce

the incentive to minimize costs and substituting them with alternatives that distort the market less could enhance efficiency. South Africa, which is a large market, may benefit from lower barriers to entry and less price regulation.

Storage capacity at major consuming centers is generally good except in Uganda, which has storage capacity equivalent to about 20 days, and Malawi, where storage capacity is even more limited. Given the price spikes caused by frequent supply disruptions landlocked Uganda has experienced in recent years, greater storage capacity would help protect the market against unanticipated supply shortages in the future.

There is a need to strengthen monitoring and enforcement of rules already in place in most study countries. Commercial malpractice, if unchecked, can take over the market and drive out efficient operators known not to engage in fraud. Short-selling transfers money rightly due to consumers to fraudulent operators. Other forms of fraud can be even most costly, especially if equipment or vehicles are damaged as a result.

Few governments in Sub-Saharan Africa make key sector data regularly available in a timely manner. Although resource-intensive, especially in countries with liberalized prices, such information empowers consumers and enables informed debates about prices and sector efficiency. Making price and other data widely available has taken on greater importance in recent years against the backdrop of soaring international oil prices and calls from different quarters in many countries for tightening or re-introducing price control to protect consumers. Price control, however, can never fully mimic an effective and well regulated competitive market that imposes relentless pressure on participants to improve efficiency and—equally importantly—to share the gains with customers. Madagascar, South Africa, and Tanzania have been posting historical prices and other information on the internet. The challenge is for other countries to begin to collect similar information and make it publicly available.

Chapter 1: Background

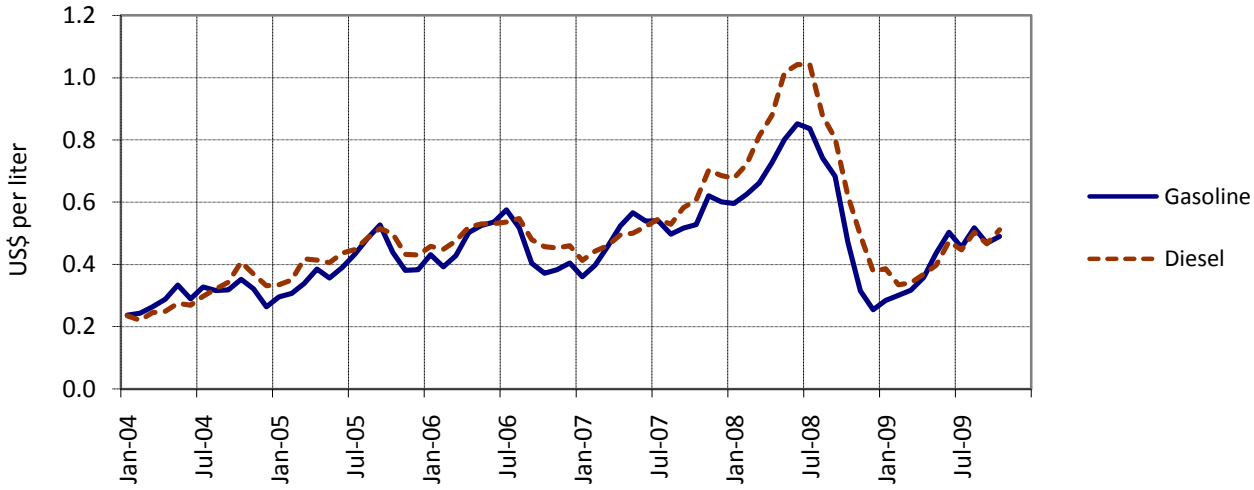
Petroleum products are used across the entire economy in every country. Gasoline and diesel are the primary fuels used in road transport. Oil is used in power generation, accounting for 11 percent of total electricity generated in Africa in 2007 (IEA 2009a). Adequate and reliable supply of transport services and electricity in turn are essential for economic development. Households use a variety of petroleum products: kerosene is used for lighting, cooking, and heating water; liquefied petroleum gas (LPG) for cooking and heating; and gasoline and diesel for private vehicles as well as captive power generation.

Prices users pay for these petroleum products have macroeconomic and microeconomic consequences. At the macroeconomic level, oil price levels can affect the balance of payments, gross domestic product (GDP), and, where fuel prices are subsidized, government budgets, contingent liabilities, or both. At the microeconomic level, higher oil prices lower effective household income in three ways. First, households pay more for petroleum products they consume directly. Most poor households in low-income countries do not own motorized vehicles or electricity generators and therefore purchase little or no gasoline or diesel, but many are not yet connected to electricity and most without access to power rely on kerosene for lighting. Second, higher oil prices increase the prices of all other goods that have oil as an intermediate input. The most significant among them for the poor in many low-income countries is food, on which the poor spend a high share of total household expenditures—often exceeding 50 percent. Food prices increase because of higher transport costs and higher prices of such inputs to agriculture as fertilizers and diesel used for operating tractors and irrigation pumps. For the urban poor who use public transport, higher transport costs also decrease their effective income. Third, to the extent that higher oil prices lower GDP growth, household income is reduced.

Globally, oil prices began to rise in 2004 and, after a sharp drop in late 2008, have been rising again (Figure 1). Global increases in petroleum product prices have adversely affected most economies that are not large net exporters of oil. Earlier studies showed that the countries most vulnerable to oil price shocks are low-income oil-importing countries, which are disproportionately concentrated in Sub-Saharan Africa (ESMAP 2005a and 2005b). High costs for transporting and marketing petroleum products increase end-use prices further and exacerbate the adverse effects of high oil prices. In two recent studies that ranked retail fuel prices in August 2008 and January 2009 in 48 and 49 developing countries, respectively, Sub-Saharan Africa countries comprised half of the top 20 for gasoline and diesel (Kojima 2009a and 2009b). An important question is then whether there is scope for reducing the costs of transporting and marketing petroleum products in Sub-Saharan Africa.

High oil prices affect the rural poor in the region directly because about 70 percent of Sub-Saharan Africans do not yet have access to electricity (IEA 2009b) and most households use kerosene for lighting. The urban poor are also affected because they are more likely to use kerosene and LPG for cooking. The impact of higher oil prices is illustrated by a study of household expenditures in Mali in 2000–01. Examining households by income category, the study showed that an increase in kerosene prices would hurt the poor the most. The study also showed that the bottom 60 percent of households spent more than 80 percent of their total expenditures on food, and, for them, indirect effects of higher oil prices—mainly from higher food prices—were as large as direct effects (Kpodar 2006).

Figure 1 Gasoline and Diesel Prices between 2004 and 2009



Source: Energy Intelligence 2009.
Note: Gasoline is regular unleaded and diesel is gasoil with 0.2 percent sulfur in northwest Europe, free on board.

All productive sectors of the economy can benefit from an efficiently managed downstream petroleum sector. High fuel costs increase the operating costs of the transport sector, this in a region where transport costs are already high for a variety of other reasons. In the power sector, a recent publication identifies more than 30 African countries that experience power shortages and regular interruptions to service. A common response to the crisis is to resort to diesel-based emergency power: at least 750 megawatts of emergency generation are operating in Sub-Saharan Africa, which for some countries constitute a large proportion of their national installed capacity (Foster and Briceño-Garmendia 2010).

Governments in Sub-Saharan Africa have historically provided protection to domestic refineries. Such protection hampers the development of an efficient sector and, by definition, raises prices paid by all consumers. Where the refineries are state-owned, protection of domestic refineries can also lead to contingent liabilities for the government. Fuel shortages are not uncommon in the region, and they have led to price spikes over and above the price movements on the world market. In addition, against the backdrop of steadily rising world oil prices in 2007 and 2008, quite a few governments abandoned formula-based pricing in order to shield consumers from the rising world prices and capped retail prices by lowering fuel taxes and other means. But such government intervention in pricing can deter effective competition and may even raise prices in the long run.

Study Description

This regional study takes 12 oil-importing countries in Sub-Saharan Africa and asks the following two questions:

- Does each stage in the supply chain, from import of crude oil or refined products to retail, seem to be efficiently run and *are* the efficiency gains passed on to end-users?
- If not, what are the potential causes and possible means of remedying the problems?

This study examines five countries in West Africa and seven in East and Southern Africa (Table 1). Country selection aimed to cover a range of conditions that affect price levels, such as market size, geography (whether landlocked or coastal), existence of domestic refineries, the degree of sector liberalization including pricing, and the level of economic development.

Table 1 Study Coverage of Sub-Saharan African Countries

Characteristics	West Africa				
	Burkina Faso	Côte d'Ivoire	Mali	Niger	Senegal
2008 Population, million	15.2	20.6	12.7	14.7	12.2
2008 GDP pc, PPP	1,161	1,651	1,128	684	1,772
2008 GDP pc, MER	523	1,137	688	365	1,082
Geographical and oil supply features	Landlocked	Coastal/ transit	Landlocked	Landlocked	Coastal/ transit

Characteristics	East and Southern Africa						
	Botswana	Kenya	Madag-ascar	Malawi	South Africa	Tanzania	Uganda
2008 Population, million	1.9	38.5	19.1	14.3	48.7	42.5	31.7
2008 GDP pc, PPP, US$	13,392	1,590	1,049	837	10,109	1,263	1,165
2008 GDP pc, MER, US$	6,808	895	469	299	5,685	482	459
Geographical and oil supply features	Land locked	Coastal/ transit	Island	Land-locked	Coastal/ transit	Coastal/ transit	Land-locked

Source: World Bank 2009a.
Notes: pc = per capita, PPP = purchasing power parity, MER = market exchange rate.

The sample included two upper-middle-income (Botswana and South Africa), one lower-middle-income (Côte d'Ivoire), and nine low-income countries (Burkina Faso, Kenya, Madagascar, Malawi, Mali, Niger, Senegal, Tanzania, and Uganda). The population in 2008 ranged from 2 million in Botswana to 49 million in South Africa.

The study relied on information collected during country visits by two consultants lasting an average of two days in each country (except Botswana and Malawi for which information was collected through telephone calls and email) and publicly available information (see annex 1). The visits to the countries in East and Southern Africa took place in November 2008 and those in West Africa in January 2009. The short duration of each visit necessarily restricted the amount of information that could be collected, and the findings of this study and its recommendations should be interpreted in the light of these data limitations. In some areas of examination, this study was able to collect more country-specific data in West Africa than in East and Southern Africa. For this reason, the treatment of the two regions is not fully harmonized in the report.

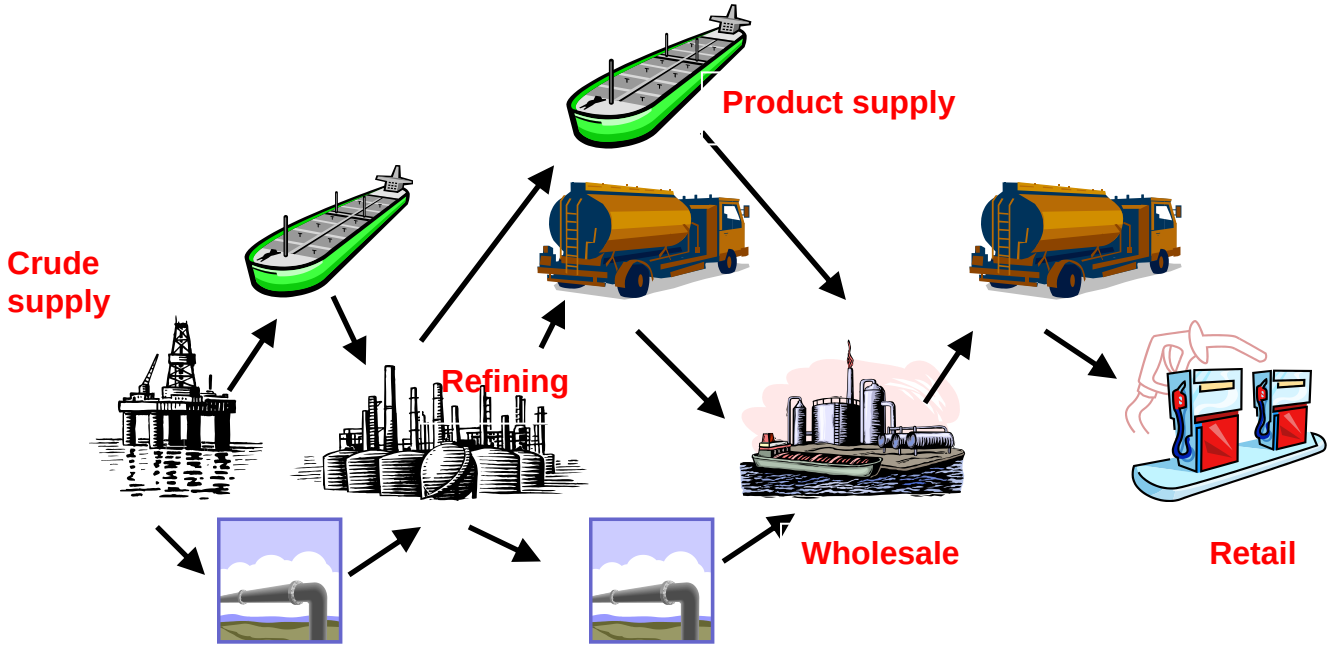
There were two additional developments that affect the interpretation of the data collected. First, as Figure 1 shows, the latter half of 2008 saw a sharp fall in the price of oil after a doubling over the previous 18 months. The degree of price volatility requires that, for cross-country comparison, data on retail prices in effect at about the same time across the 12 countries be collected. Several countries, however, do not report retail prices on a regular basis to the public, and having only two consultants visit the countries two months apart meant that data collection could not be undertaken at the same time. Second, prices charged did not reflect costs in the

countries where governments adopted policies to shield consumers from the world oil price increases in 2007 and 2008. Price smoothing typically consists of under-charging when international prices are high and over-charging when prices are low to make up for the losses suffered due to under-charging earlier. Such attempts at price smoothing make it difficult to assess the underlying cost structure.

Petroleum Product Supply Chain

To understand what affects retail prices, it is useful to review different stages in the petroleum product supply chain (Figure 2). Annex 2 provides a more detailed description.

Figure 2 Petroleum Product Supply and Distribution Chain



Crude oil is extracted and transported to a refinery, typically by ship or pipeline. Because each refinery is configured for specific types of crude, minimizing cost is not simply a matter of purchasing the lowest-cost crude. Economic refineries are generally located near major markets and are large-scale and with complex processing facilities adapted to the market requirements. These requirements include relative amounts of different fuels consumed—a market with high ownership of cars may consume more gasoline than one that is dominated by industrial activities requiring more fuel oil for boilers and diesel fuel for freight transport—and fuel quality such as the octane number of gasoline (see annex 3 for product specifications in 10 study countries). Crucially important, economic refineries today have cracking facilities to convert residual fuel oil (demand for which has been steadily declining) to so-called white products: LPG, gasoline, kerosene, and diesel, which are in growing demand.

Once refined, petroleum products of the required amount and quality are transported to storage facilities close to the final markets. This activity entails coordination of procurement and transport logistics, including considerations of volumes required, procurement methods, price,

location, contracting terms, and supply reliability. Transport modes from refineries to secondary storage include marine tankers, pipelines, road tankers, rail, and barges.

Shipping crude oil or petroleum products incurs costs for freight, insurance, wharfage (charge assessed against cargo for usage of a wharf or pier and its facilities), inspection, demurrage (charge for detaining a ship over and above the time normally given to unload), and marine transit losses. Congested ports, slow customs clearance, and any other factor delaying discharging of the fuel could incur large demurrage costs. Once landed and sent to a bulk oil terminal, petroleum products incur additional costs, including storage, transport, retailing, and wholesalers' and retailers' profit margins.

Wholesale distributors are generally synonymous with oil marketing companies. Wholesale marketing involves the acquisition from the bulk supply link of petroleum products of the quality and in the volume appropriate to the market. Products are delivered by road tanker to the oil marketing companies' affiliated (branded) retail service stations, as well as to bulk consumers such as power generation plants, industry, large commercial customers, government agencies, and transport fleet operators such as trucking companies and bus operators. In some markets, oil marketing companies may also deliver petroleum products to independent retailers under supply contract sales arrangements. Oil marketing companies may own the assets used in their operations or outsource most of the road transport activities to independent owner-operators and use storage depots owned by others under throughput fee arrangements.

Retail marketing involves selling gasoline, diesel, and lubricants at service station outlets and kerosene and LPG through other shops. Depending on the arrangements with dealers, oil marketing companies have varying degrees of ownership of the assets of their own network.

LPG, which is stored under pressure, has special requirements. LPG can be sourced from a refinery or a natural gas processing plant. Worldwide, 60 percent of LPG comes from natural gas. LPG is transported by large LPG carriers, pipelines, or trains to storage terminals which may be underground, refrigerated, or pressurized. From storage terminals, LPG is delivered by train, road, coastal tanker, or pipeline to cylinder filling plants and intermediate-size storage areas where it is generally stored in pressurized vessels or spheres. Cylinders are filled with LPG at bottling plants. Trucks transport LPG cylinders from the bottling plant to retailers as well as to bulk customers. LPG is available to end-users through cylinder sales points such as commercial stores and service stations.

Storage capacity, which exists at every point in the supply chain, is important because stocks can be used to help reduce the magnitude of sharp price spikes due to physical disruptions to supply (Bacon and Kojima 2008). Such protection against supply shortages may be particularly important for landlocked countries. Storage capacity is expensive to build and holding stocks within this capacity also incurs substantial additional financial costs. As a result, companies hold contingency stocks to avoid stock-outs but uses just-in-time inventory management just as in any other business and strive to optimize their capacity with other links in their supply-and-delivery chain. Maximum cost efficiency is achieved when this optimization is achieved and contingency stock levels are the result of a careful risk assessment. The optimal level is situation-specific and there is no typical standard.

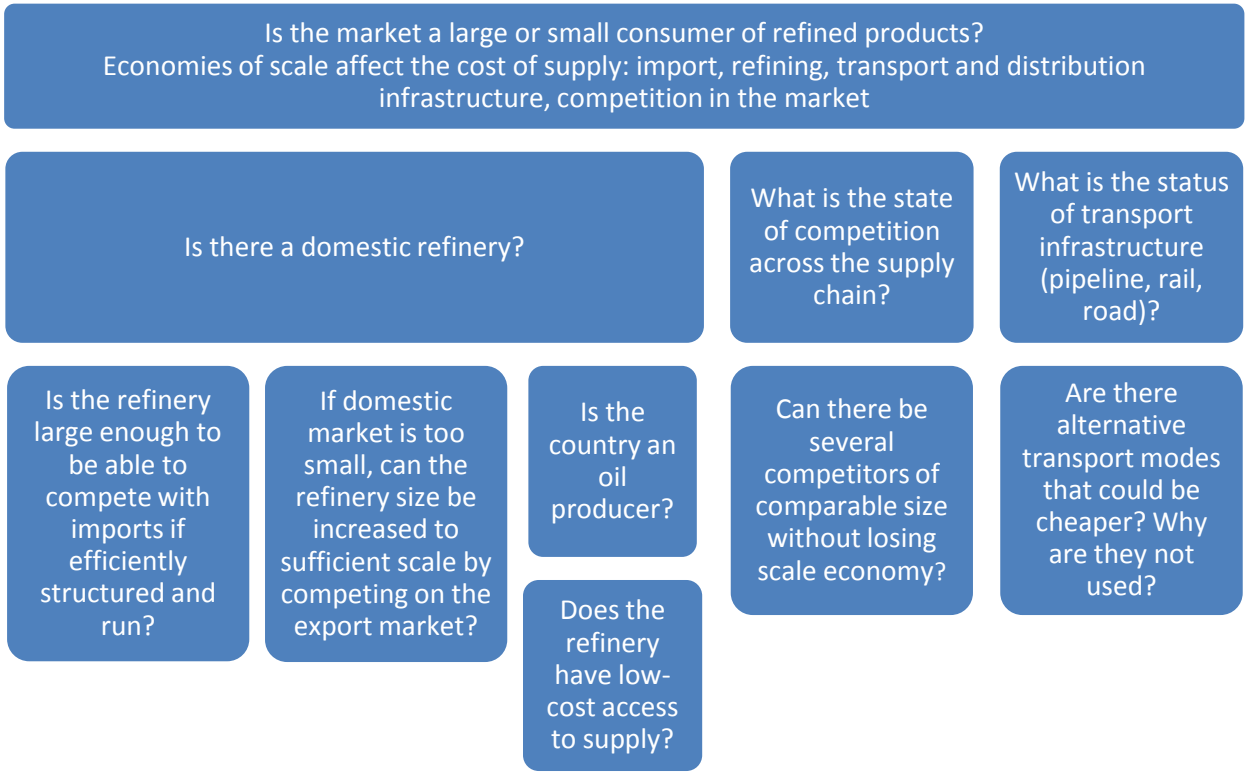
Factors Affecting Price Levels

For a given price of a petroleum product on the world market, end-user prices net of tax are affected by a number of factors. Some are under the control of the government to varying degrees; others are outside the control of the government, and, in some situations, outside the control of any actor in the country.

Market Size

Market size is an important determinant and affects end-user prices through various channels. Large markets can enjoy economies of scale in procurement and supply infrastructure, and accommodate enough large actors to create healthy and effective competition (Figure 3).

Figure 3 Impact of Market Size on Price Levels



Source: World Bank staff.

Economies of Scale

Economies of scale are particularly important for refining. Product demand has been increasingly moving away from fuel oil to gasoline, kerosene, and diesel, requiring cracking of residual fuel oil to white products. At the same time, fuel specifications are being tightened progressively, in particular requiring so-called sulfur-free gasoline and diesel in developed countries. Producing white products meeting tight fuel specifications requires processing units that enjoy large economies of scale. As a basic rule of thumb, a refinery needs to have a processing capacity of at least 100,000 barrels a day (or 5 million tonnes a year) to be economic in a liberalized market. Because it is disproportionately expensive to install small cracking units, small refineries tend to be hydroskimming refineries—hydroskimming refineries have no ability to convert residual fuel

oil to white products and have only the units that raise the octane number of gasoline but not the volume of gasoline produced (World Bank 2008a). If domestic demand for petroleum products is small and much less than the production capacity of an economic-scale refinery, as in many countries in Sub-Saharan Africa, then a refiner is faced with two options: build a sub-economic-scale refinery to serve primarily the domestic market, or build an economic-scale refinery and export some or even the bulk of the products. A sub-economic-scale refinery is unlikely to be able to compete with product imports from large and efficiently-run refineries. A world-scale export refinery can take advantage of economies of scale, but will face full international competition. If a refinery is processing domestic crude oil, there is a potential cost advantage: the cost of shipping crude or refined products is not incurred. Similarly, a refinery may have access to relatively low-cost crude oil if, for example, it is a transit country for a crude oil pipeline. But such a cost advantage can be easily offset by higher refining costs if the refinery is small (World Bank 2008a and 2008b).

Competition

It is not easy to have effective competition in a small market, again because there are economies of scale in establishing and managing supply assets and in fuel procurement. A large market can accommodate several actors, all enjoying requisite economies of scale, but a small market not necessarily so. This is particularly true for product import, refining, and wholesale. The larger the marine tanker carrying petroleum products, the lower is the unit cost of shipping. This requires two conditions: first, the volume to be purchased be sufficiently large to fill an economic-size tanker, and second the port be capable of handling large tankers. Some small markets have used joint bulk import with varying degrees of success. Refining and pipeline transport effectively become natural monopolies in small markets. Provided minimal scale requirements are met—the requisite scale economy is not achieved in many markets in the region—and infrastructure is well maintained, for long-distance transport over land, pipelines offer the lowest-cost option, followed by rail, and then road. But pipelines, just as with refineries, require large upfront investment, regular maintenance, and a reliable source of power.

International experience points to the importance of establishing fair, healthy, and transparent competition in the downstream petroleum sector. An effective and well regulated competitive market imposes relentless pressure on participants to improve efficiency and—equally importantly—to share the gains with customers. A competitive market also reduces opportunities for corruption and provides a sound basis for attracting new private investment without creating contingent liabilities for government. A monopoly supplier by definition is not competing, although in small markets there may be natural monopolies. Where effective competition is not possible, economic regulation is needed. Protection provided to domestic refineries through import tariffs increases government revenue in the short run but, by increasing petroleum product prices throughout the economy, could hurt economic growth and lower long-term government revenue.

State Ownership

State-owned enterprises face special challenges. Whether they can achieve sound operational and financial performance is highly dependent on their ability to be commercially focused, with clear objectives, an appropriate governance structure, and adequate human and financial resources to

fulfill their objectives. State-owned enterprises that face soft budget constraints, or are monopoly suppliers, are less likely to pursue efficiency improvement aggressively.

Government Pricing Policies

Pricing policies can have large effects on supply efficiency. Subsidies require that government estimate what would have been market prices in their absence. In a liberalized market, even the most efficient fuel supplier may lose money from time to time, but a guaranteed subsidy reimbursement, particularly if subsidies are computed on a cost basis, may eliminate any loss of profit, potentially reducing the incentives to pursue efficiency improvement aggressively. Pan-territorial pricing, whereby fuels obtained in the lowest-cost and highest-cost manners are sold on the market at the same price by means of, for example, tax adjustment, may similarly reduce incentives to minimize cost. A firm that is guaranteed a purchase price through a price or subsidy formula may still pursue a business strategy of cost minimization, but the objective would be to retain surplus profits rather than to lower end-user prices to become more competitive; efficiency gains are not passed onto consumers. If government imposes price ceilings and the *de facto* subsidies are not reimbursed, or if reimbursement is several months or years behind schedule, companies will be drained of funds and not be able to undertake regular maintenance of their assets, let alone modernization and expansion. This leads to operation of outdated and poorly maintained assets, raising end-user prices in the long run. Ad-hoc government intervention in pricing to shield consumers from price volatility on the world market, resulting in unpredictable pricing policy, makes business planning difficult and could discourage entry and retention of experienced, efficient operators.

Regulation and Enforcement

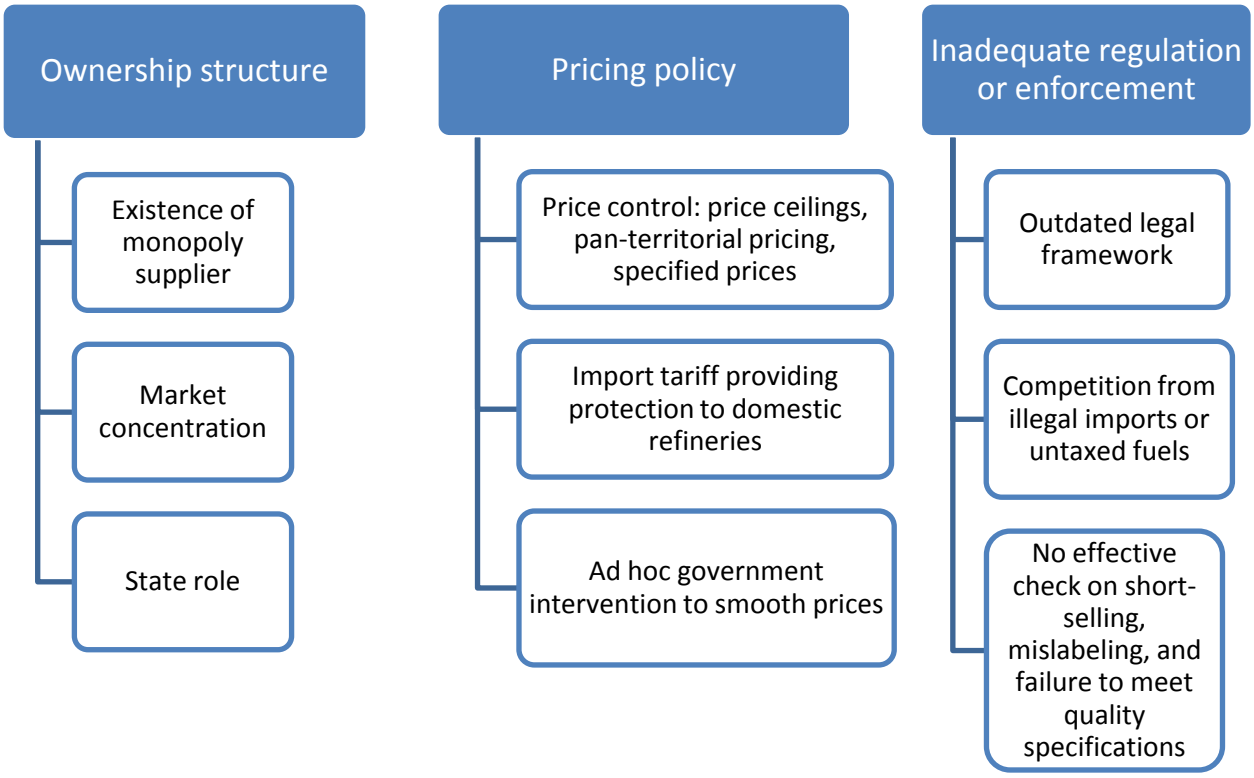
Inadequate regulation and enforcement can also harm the efficiency of fuel supply. Sector regulations that have not been updated in decades, lack sufficient coverage, or continue to list outdated fuel specifications may deter entry of experienced operators adhering to high standards. An efficient legal framework for the downstream petroleum sector requires legislation that clearly defines and limits the role of the government in order to avoid undue interference and establishes principles and rules for the private and public participants in the supply chain in order to create a level playing field and promote fair, transparent, and healthy competition. Laws should not include technical details but create the legal basis for the adoption and application of internationally acceptable technical standards appropriate for the conditions in the country. Simple and clearly defined procedures for the implementation of the law and standards should be set in regulations.

Similarly, a lack of enforcement resulting in wide-scale sale of fuels evading taxes, illegal cheap imports from neighboring countries, short selling, mislabeling (for example, low-octane gasoline sold as high-octane gasoline), fuel adulteration, and sale of fuels that do not meet minimal quality standards may lead to partial or total product degradation. A low-quality product could drive out a high-quality product because of consumers' difficulty in distinguishing between the two, especially if there is no effective monitoring and enforcement. Even if prices initially are kept at a level that would cover the costs of the high-quality product, the excess profits that unscrupulous firms can gain by selling a low-quality product would encourage them to cut prices in order to increase sales. Eventually prices could drop until they cover only the costs of the low-quality product. But with sufficient enforcement and reputational risk, firms known not to

engage in abuses might be able to expand their market shares and drive out unscrupulous firms. In the short run, cheap illegal imports and fuels evading taxation may benefit consumers. Over the long run, two effects—loss of tax revenues, which could otherwise be spent on primary health, education, and other public services; and exit from the market of firms not prepared to engage in commercial malpractice—could harm both the sector and society.

The foregoing discussion on the impact of sector structure and government policies on the incentives for minimizing costs and delivering quality service is sketched in Figure 4.

Figure 4 Sector Structure and Policies Affecting Price Levels



Source: World Bank staff.

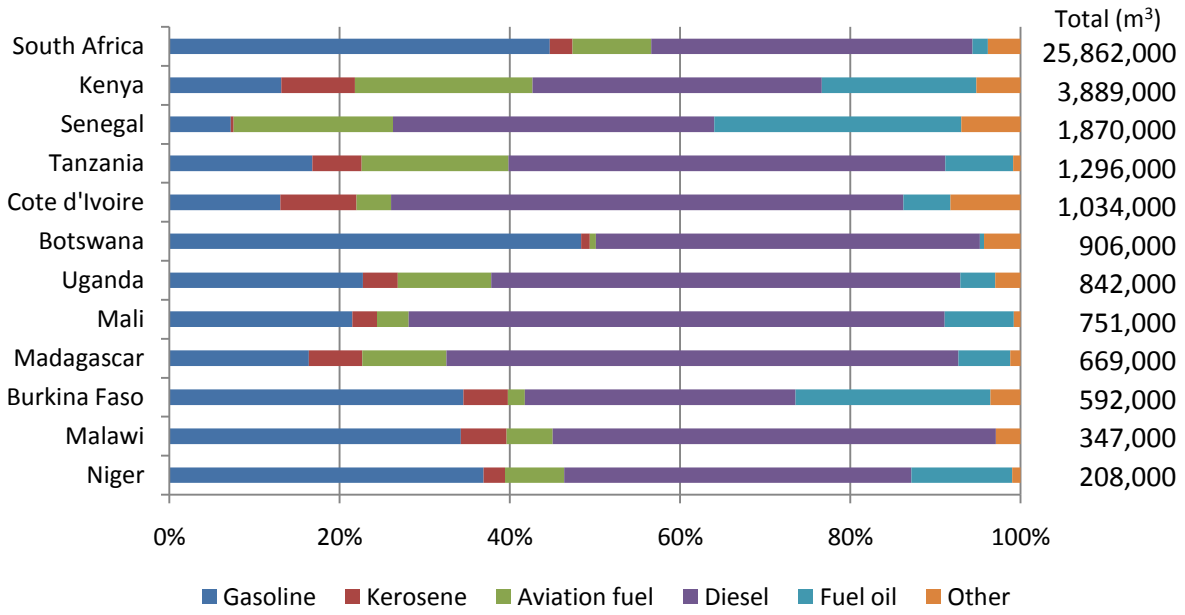
Chapter 2: Overview of Downstream Petroleum Sector

Different stages of the supply chain and the factors that can potentially affect price levels given in Figure 3 are discussed below. This chapter begins with petroleum product consumption patterns in the 12 countries, then describes the supply infrastructure and logistics, and concludes with a discussion on oil marketing companies and market concentration. More detailed information is provided in annexes 4 through 15.

Petroleum Product Consumption

The market sizes of the countries under study varied in 2007 from 26 million cubic meters (m^3)—or 450,000 barrels a day—in South Africa to 200,000 m^3 (3,600 barrels a day) in Niger (Figure 5). Daily consumption in Senegal, the third largest market, was 32,000 barrels, which is small by any measure. The limited size of overall consumption in nine out of 12 countries illustrates the challenges they face in establishing an efficient and competitive downstream petroleum sector.

Figure 5 Demand by Product and Country in 2007



Souces: Official government statistics and data from industry associations.

Diesel comprised more than half of total consumption in six countries: Côte d'Ivoire, Madagascar, Malawi, Mali, Tanzania, and Uganda. Even in Burkina Faso, where the share of diesel was the lowest among the 12, it was close to one third. The share of gasoline was one third or higher in five countries: Botswana, Burkina Faso, Malawi, Niger, and South Africa. It was close to a half in Botswana and South Africa, two countries with the highest per capita income. In the remaining seven countries, the share of gasoline was less than a quarter, and as low as 7 percent in Senegal. Kerosene consumption is modest in all countries and practically nonexistent in Senegal where LPG sold in small cylinders is subsidized to promote its use by households as a cooking fuel. Demand for aviation fuel was high in Kenya, Senegal, and Tanzania, which have hub airports serving the region.

Fuel oil demand is about 10 percent of the total on average, with Kenya, Senegal, and Tanzania double that at some 20 percent of their total consumption where it is used for power generation and marine bunkers. While fuel oil is much less expensive than diesel on international markets, it needs to be segregated and heated during shipping and requires certain scale economy for use. The specialized logistics investments required present a barrier to higher use of fuel oil, particularly in small landlocked countries.

Refining Capacities

There are domestic refineries in four study countries. All four governments protect their domestic refineries from competition from imports, although the extent of protection varies markedly. The refineries in Côte d'Ivoire and Senegal are majority-owned and the refinery in Kenya 50 percent owned by the government. Two refineries in South Africa are entirely privately owned; the remaining two and all synthetic fuel plants (making liquid fuels from coal and natural gas) are partly or wholly owned by the government.

Table 2 shows the total processing capacity and the combined capacity for cracking fuel oil—catalytic cracking for maximizing gasoline production and hydrocracking for maximizing diesel production—at each crude oil processing refinery. Taking 100,000 barrels a day as a leading-order benchmark for economic refineries in a liberalized market, it is clear that the refinery in Senegal cannot be economic. The refinery in Kenya, while reasonably sized, does not have any cracking capacity and is capable of running only at less than half of its nominal capacity, making it difficult to compete with imports. The refinery in Côte d'Ivoire is not large but has a hydrocracking unit. The four refineries in South Africa are all reasonably sized with cracking facilities. NATREF is the only refinery in the table with both hydrocracking and catalytic cracking units. In addition, South Africa has coal-to-liquids and gas-to-liquids plants, manufacturing high-quality diesel. Combined, these units have a crude processing equivalent capacity of about 200,000 barrels a day.

Table 2 Oil Refineries in Study Countries

Country	Refinery	Total capacity (barrels a day)	Cracking capacity (barrels a day)
Côte d'Ivoire	Société Ivoirienne de Raffinage (SIR)	63,990	14,480
Kenya	Kenya Petroleum Refineries Limited (KPRL)	90,000	0
Senegal	Société Africaine de Raffinage (SAR)	25,030	0
South Africa	Caltex Oil	110,000	22,300
	Engen Petroleum Limited	118,750	20,385
	National Petroleum Refiners of South Africa (NATREF)	87,547	37,434
	Shell and BP South African Petroleum Refineries (SAFREF)	169,000	35,680

Source: Oil and Gas Journal 2008.

The two state-owned refineries in West Africa are central to the supply of petroleum products but both have experienced financial crises in recent years. SIR in Côte d'Ivoire encountered financial difficulties following a political decision to hold the ex-refinery prices down through the 2007–2008 international price escalation. In the case of SAR in Senegal, which meets about half of the country's demand, the problem is more fundamental. The refinery is too small to be able to compete with petroleum product imports and accumulated a large debt. Although SAR

has weathered the immediate financial problem through the government imposition of a special charge for amortizing the debt in the price structure, such a move does not address the question of its long-term viability.

KPRL is the only refinery in East Africa. While its nominal capacity is larger than the country's total consumption, the refinery operates at far below the installed capacity. Its operations have also been disrupted by water shortages and grid power outages. In fact, the frequency of the disruptions to the refinery operation prompted the Kenyan energy minister in February 2009 to instruct the refinery to generate its own electricity (*Daily Nation* 2009). Lacking any cracking facility, the refinery's output does not match demand patterns, producing too much fuel oil relative to white products. New refinery management has committed to spending about $400 million on upgrading the refinery and constructing a 24-megawatt power plant (*All Africa* 2009b).

Supply Infrastructure

In Botswana, Madagascar, South Africa, Tanzania, and Uganda, local oil marketing companies procure all petroleum products, free of government involvement. At the other extreme, Burkina Faso, Côte d'Ivoire, and Niger acquire all their products through state-owned monopoly suppliers. The remaining four countries use a mix of private sector supply and government supervision.

Ports

The primary import ports for all countries can receive adequately-sized cargoes relative to their markets. The Kurmani Oil Jetty in Mobasa in Kenya is capable of receiving 80,000 dead-weight-tonne tankers, more than adequate for refined product cargos which are typically about 30,000–60,000 tonnes. All primary ports, except possibly Dakar, Senegal and Durban, South Africa,[1] have adequate shore storage capacity. Senegal's capacity in the Dakar port is 65 days of consumption compared with the capacity of the Vridi port in Côte d'Ivoire equivalent to 141 days. Both the government and the industry recognize that the Dakar capacity is tight and are now in the process of expanding it. In Abidjan and Vridi in Côte d'Ivoire, there is considerable trans-shipping and export business and a requirement for the main storage operator, *Société de Gestion des Stocks de Sécurité* (Security Stock Management Company), to hold the industry's security stocks.

Third-party imports into, and storage in, Durban are restricted. Madagascar's only significant import port, Tamatave, belongs to the Galena Refinery Terminal, a private oil marketing company; no other company has been able to obtain a permit to construct a terminal at the Tamatave port. There is no third-party access to storage terminals at the two primary ports in Côte d'Ivoire, Abidjan and Vridi, nor in Cotonou, Benin which is the primary port of entry for petroleum products destined for Niger.

[1] Statistics on storage capacity in South Africa are, for reasons no longer valid, confidential. However, anecdotally several interviewees mentioned during the consultant visit that access to third-party storage was a serious problem.

Pipelines

Product pipelines exist in Kenya and South Africa. The pipelines are state-owned in both countries. The 30-year-old Mombasa-Nairobi section of the oil pipeline in Kenya has at times operated at only 50 percent of capacity, partly because of erratic power supply (*East African* 2007). Undertaking pipeline repairs has also reduced the volume of fuel shipped. Switching to trucking is not easy because of poor road conditions and slow border clearance. Work was to begin in May 2009 on extending the product pipeline from Eldoret in Kenya to Kampala in Uganda but the start of construction has been postponed, mainly due to the fact that not all of the land for the route has been acquired. This vital project has been delayed for years: the first memorandum of understanding was signed in 1995, and an invitation for expressions of interest was issued in May 2004. With discovery of oil in Uganda, there is a proposal to redesign the pipeline to accommodate a reversed flow of oil and petroleum products. Such a redesign is likely to result in a further delay (IHS Global Insight Daily Analysis 2009).

South Africa has both crude oil and petroleum product pipelines. Petronet, a subsidiary of Transnet, which is majority owned by the government, is responsible for their operation. An impediment to price efficiency is a temporary capacity constraint on the Transnet pipeline from Durban to South Africa's industrial heartland, Gauteng. This affects the cost of product supply not only to South African markets but also to Botswana. In response, Transnet has a plan to build a new multi-product pipeline.

Storage

Storage capacity at major consuming centers is generally good except in Malawi and Uganda. Dar es Salaam has the greatest number and diversity of oil terminals in Sub-Saharan Africa; there are 13 separate installations with a total storage capacity of almost 500,000 m^3, equivalent to 137 days of consumption. Despite the concerns expressed in an October 2007 order by the Energy and Water Utilities Regulatory Authority (EWURA)—about a lack of transparency in third-party access and complaints of high hospitality charges, discrimination, and denial of access to local oil marketing companies—terminal fees are low. Uganda has storage capacity equivalent to about 20 days, and that in Malawi is even more limited. Given the frequent supply disruptions landlocked Uganda has experienced in recent years, greater storage capacity would be needed to protect the market against unanticipated supply shortages in the future.

Thanks to storage and loading racks at most of Kenya Pipeline Company's and some of Transnet pipeline's take-off points, third-party access is not a problem in Kenya or South Africa. Because of the numbers of participants, third party storage access is not a problem in Tanzania or Uganda. Third-party access in Botswana and Malawi is more problematic and is likely allowed only on a quid-pro-quo basis.

Land transport infrastructure and equipment for bulk movement of oil products is only fair, with potential for improvements. There are prospects for product pipelining in West Africa with the state oil company *Société Nationale d'Operations Pétrolières* (Petroleum Operation National Company) in Cote d'Ivoire engaged in the construction of an Abidjan-Yamoussoukro-Bouaké multi-product line with the possibility of future extensions to Bobo-Dioulasso in Burkina Faso and to Mali.

Rail Transport

To the extent that rail transport exists, it is generally under-utilized. The 1,260-kilometer Abidjan-Bouaké-Bobo-Dioulasso-Ouagadougou line, operated by privately-owned Sitarail, runs through Côte d'Ivoire and Burkina Faso. Products are also trucked from the railway station in Bobo-Dioulasso to Mali. The line is fairly well utilized and Sitarail is keen to do more business but volume has been constrained by the internal conflict in Côte d'Ivoire and falling procurement of petroleum products from SIR by the *Société Nationale Burkinabè d'Hydrocarbures* (SONABHY, Burkina National Hydrocarbon Company). The planned product pipeline presents competition to rail.

The 1,250-kilometer line between Dakar in Senegal and Bamako in Mali has been managed since 2003 by a private concession holder, Transrail Consortium. Transrail has not made much progress in rehabilitating and expanding the infrastructure and improving the quality of service. Transrail's management reportedly has little incentive to invest in the rail infrastructure to maintain the capability to transport petroleum products. The tank wagons are left standing for weeks at a time at the unloading depots, exposing them to theft and product deterioration. This results in large non-technical losses. Most Mali importers have trucking business, further discouraging the promotion of rail transport. For these reasons, the rail volume has declined to a fraction of the total volume moved in West Africa.

In Malawi, Tanzania, and Uganda the under-utilization is due to the run-down state of the rail infrastructure. Two railways in Tanzania are not competitive and lose out to more expensive road haulers. The rail line from Nacala in Mozambique to Malawi is in poor condition. Given disruptions to pipeline operation in Kenya, rail is theoretically an alternative option but is slow and the rail freight tariffs are more than double the pipeline tariffs. In Madagascar, the sole (monopoly) distribution company, *Logistique Pétrolière S.A.* (Petroleum Logistics Company), appears to favor road transport over rail despite the ability of Madarail to move much more oil at a significantly lower cost.

Trucking

It is common practice in the long-distance petroleum product trucking business in West Africa and elsewhere to acquire imported second-hand trucks and reconstruct the tanks to carry far above the design capaciy. Overloading is unsafe and causes excessive road damage, but enforcement is weak and the axle load limits are regularly exceeded. In the very short run, overloading can reduce transport costs: it would generally be cheaper to have two overloaded trucks carry 30 tonnes of freight between them than three properly loaded trucks carrying 10 tonnes each. Another aspect of long-distance trucking is the large number of formal and informal charges that must be paid on the routes between coastal depots and their inland depot destinations. These high costs provide incentives to minimize the number of trucks used to transport a given amount of fuel, such as by overloading. When Kenya started enforcing the three-axle limit rigorously in 2008, fuel shortages ensued. Over the long run, however, overloading causes more accidents and increases the cost of proper vehicle maintenance, and damaged roads slow the speed of even properly maintained and loaded trucks and rules out the possibility of using highly-efficient, longer, and higher-gross-weight trucks.

Fuel supply arrangements and supply infrastructure are summarized for West Africa in Table 3 and East and Southern Africa in Table 4. Eight out of 12 countries rely entirely on petroleum

product imports. Côte d'Ivoire and South Africa rely mostly on their domestic refineries, all others on imports. The sources of direct product imports through coastal terminals in West Africa are generally regional refineries (Nigeria, Côte d'Ivoire, Canary Islands) and continental Europe; in East and Southern African, imports are from regional refineries (South Africa, Kenya) or the Middle East.

Table 3 Supply Arrangements and Logistics Infrastructure in West Africa

Characteristics	Burkina Faso	Côte d'Ivoire	Mali	Niger	Senegal
2007 consumption ('000 m^3)	592	1,034	751	208	1,870
Product imports (% of total)	100	5	100	100	60
Primary sources of supply	• SIR refinery in Abidjan, Côte d'Ivoire • Lomé, Togo • Cotonou, Benin • Tema refinery, Ghana	• SIR refinery in Abidjan, Côte d'Ivoire	• Dakar, Senegal • SIR refinery in Abidjan, Côte d'Ivoire • Lomé, Togo • Cotonou, Benin • Tema refinery in Ghana	• Cotonou, Benin • Lomé, Togo • Tema refinery, Ghana • Fuel smuggling from Nigeria	• SAR refinery • Product imports
Supply arrangements	SONABHY procures all petroleum products through a mix of open and restricted tenders, direct purchases, and long-term contracts with Abidjan, Cotnou, and Tema.	SIR procures Nigerian crude based on allocation from Nigeria.	More than 50 Mali importers largely negotiate their own arrangements with suppliers. There is still an official state-state price from SIR, Abidjan and SAR, Dakar.	For legal imports, SONIDEP procures all supplies through restricted tenders or equivalent negotiations.	Government procures crude for SAR via state-to-state deal with Nigeria. A committee of government and licensed importers assesses product deficits every 15 days and allocates import entitlement to one or more operators.
Primary port for imports	Lomé	Abidjan/Vridi	Dakar	Cotonou	Dakar
Maximum tanker size (dead weight tonnes)	50,000	30,000	50,000	30,000	50,000
Third party access to storage terminals	Yes	No	Yes	No	Yes
Secondary port for imports	Cotonou	No secondary port	Cotonou	Lomé	No secondary port
Primary transport to main consuming centers	Rail and road	Rail and road	Road	Road	Road
Current transport capacity	Good	Good	Good	Good	Good
Third party access	Yes	Yes	Yes	Yes	Yes
Main consuming center	Ouagadougou	Abidjan	Bamako	Niamey	Dakar
Third party access to storage depots	No	Same as primary port	Yes	No	Same as primary port

Sources: World Bank consultant interviews with government and industry officials.
Note: SONIDEP = *Société Nigérienne de Dépôt d'Essence et de Pétrole* (Niger Oil and Gas Depot Company)

Table 4 Supply Arrangements and Logistics Infrastructure in East and Southern Africa

Characteristics	Botswana	Kenya	Madagascar	Malawi	South Africa	Tanzania	Uganda
2007 consumption ('000 m^3)	906	3,889	669	347	25,862	1,296	842
Product imports (% of total)	100	51	100	100	5	100	100
Primary sources of supply	South African refineries	KPRL refinery in Kenya, product imports	Middle East	South Africa, Middle East	South Africa	South Africa, Middle East	KPRL and Middle East
Supply arrangements	All done by OMCs without government involvement.	All registered OMCs must process crude oil at KPRL and participate in open tenders for that crude, and separately for 70% of petroleum products.	All four OMCs voluntarily import on a joint cargo basis; there is no government involvement.	Products are imported on an annual open tender basis by Petroleum Importers Ltd., a private company comprising the four OMCs.	All done by OMCs without government involvement.	All done by OMCs without government involvement.	All done by OMCs without government involvement.
Primary port for imports	Durban in South Africa	Mombasa, Kurmani	Tamatave	Beira in Mozambique	Durban	Dar es Salaam	Mombasa and Kurmani in Kenya
Maximum tanker size (dead weight tonnes)	45,000 to 50,000	80,000	Greater than 50,000	40,000	45,000 to 50,000	45,000	80,000
Third party access to storage terminals	Quid pro quo	Yes	In theory	Limited	Quid pro quo	Yes	Yes
Secondary port for imports	No secondary port	Mombasa and Shimanzi	None accepting ships greater than 20,000 dead weight tonnes	Dar es Salaam, Nacala	No secondary port for petroleum products	No secondary port	Dar es Salaam in Tanzania
Primary transport to main consuming centers	Pipeline to Gautang in South Africa	Pipeline	70% by road	Road and rail	Pipeline	Road	Pipeline to Eldoret, then road
Current transport capacity	Pipeline constraint in South Africa	Good	Good	Good for road, poor for rail	Constrained	Poor	Fair
Third party access	Yes	Yes	No	Yes	Yes	Yes	Yes
Main consuming center	Gaborone	Nairobi	Antananarivo	Lilongwe & Blantyre	Gauteng	Dar es Salaam	Kampala
Third party access to storage depots	Quid pro quo	NOCK grants access, or quid pro quo	Yes	Yes, if spare capacity	Quid pro quo	Yes	Limited

Sources: World Bank consultant interviews with government and industry officials.
Notes: OMC = oil marketing companies, NOCK = National Oil Corporation of Kenya.

Market Structure

The number of oil marketing companies and measures of market concentration are given in Table 5. A standard measure of industrial concentration is Herfindahl-Hirschman index (HHI), which is calculated by summing the squared market shares of all of the firms in the industry. The U.S. Department of Justice considers an industry concentrated if the HHI exceeds 1,800; it is unconcentrated if the HHI is below 1,000. The table shows the total number of oil marketing companies, the market share of the company with the largest market share, the combined market share of the top four companies, and the HHI in each country. The table also computes the hypothetical HHI if all the companies operating in the sector had an equal market share.

Table 5 Market Structure Features of Study Countries

Country	2007 consumption (m^3)	Number of oil marketing companies	Market share of leader (%)	Market share of top four (%)	HHI	HHI if each company has an equal share
Botswana	910,000	5	31	93	2,367	2,000
Burkina Faso	590,000	19	38	71	1,963	526
Cote d'Ivoire	1,000,000	23	25	75	1,544	435
Kenya	3,900,000	25	32	80	1,937	400
Madagascar	670,000	4	34	100	2,675	2,500
Malawi	350,000	4	n.a.	100	2,800	2,500
Mali	750,000	53	15	46	915	189
Niger	210,000	18	48	83	2,959	556
Senegal	1,900,000	13	40	84	2,445	769
South Africa	26,000,000	9	25	71	1,699	1,111
Tanzania	1,300,000	25	16	50	1,107	400
Uganda	840,000	40	33	69	1,831	250

Sources: World Bank consultant interviews with government and industry officials, official government statistics, and authors' calculations.
Note: n.a. = information not available.

Mali has the largest number of operators and is the least concentrated. The Niger market is the most concentrated and is closely followed by Malawi, Madagascar, Senegal, and Botswana. The concentration of the Senegal market is surprising because significant legislative measures have been taken to promote open access to the depot capacity in Dakar. In Madagascar, Malawi, and South Africa, the actual HHIs do not depart significantly from the theoretical values assuming equal shares by all firms, suggesting that the market is fairly evenly shared.

Chapter 3: Policies that Affect Price Levels

As Figure 4 shows, government policies—to establish and protect state-owned enterprises, exercise influence over price levels, and establish and enforce regulations, to mention a few—have immediate and long-term effects on price levels.

Legal Framework

A clearly defined and stable legal framework that takes into account lessons learned from national and international experience, and effective monitoring and enforcement of the laws and regulations in effect, is important for creating a level playing field and fostering effective competition.

The situation in the 12 study countries is mixed. With the exception of Senegal, the remaining four countries in West Africa need much work to strengthen their legal and institutional frameworks. The four countries have not modernized their legal framework in decades and rely on disparate texts from French colonial times. Their institutional setup also largely reflects the old French system with the sector licensing and pricing reporting through the ministry of commerce, while the equivalent of an energy ministry is mandated to deal with such technical issues as petroleum product quality and the mechanical integrity and safety of installations.

There are problems throughout the West African region with weak monitoring and enforcement of the regulations in effect. Mali has made some progress with customs surveillance using a contracted inspection firm. Senegal has an updated legal framework and specialized regulatory institution, but has not yet developed effective enforcement.

A frequently encountered deterrent to developing a comprehensive legal framework and centralized, specialized regulatory and enforcement institutions is the presence of a strong state company, dominating a major segment of the sector. The state entity all too often ends up regulating itself and, in some instances, other commercial operators. This may be the case in SONABHY in Burkina Faso, SIR in Côte d'Ivoire, and SONIDP in Niger.

The seven countries in East and Southern Africa have established reasonably good legal and institutional frameworks, but oversight and enforcement are weak in the region with the exception of Botswana and South Africa. The remaining five countries need to strengthen their regulatory and institutional capacity more. They have limited resources to be able to afford the necessary structures required to achieve efficient pricing.

Tanzania's EWURA appears to be doing a good job. It is the only regulator in East Africa that regularly makes available on its Web site

- indicative retail prices and price ceilings for gasoline, kerosene, and diesel by location; and
- wholesale prices.

Its 2008 annual report provides detailed statistics about product quality test results, the number of operators and installations, capacities and physical conditions of the installations, import statistics, and monthly international and domestic retail prices.

An example of downstream oil sector legal texts that require review is fuel quality. On the books Madagascar appears to be retaining a grade of leaded gasoline with a research octane number of

87 and with a maximum lead content of 0.30 grams per liter. Gasoline worldwide is unleaded today with a limit of 0.013 grams per liter. While gasoline in Madagascar is likely to be unleaded, revising old fuel specifications to be in line with minimally acceptable international standards is important.

The problem with fuel specifications is more serious for diesel. Burkina Faso, Côte d'Ivoire, Mali, and Niger retain an outdated maximum sulfur specification of 1.0 percent by weight. Senegal has a maximum specification of 0.5 percent, as do the countries in East and Southern Africa. The actual quality supplied in West Africa is generally in the range of 0.15 to 0.2 percent because the sulfur content of the crude oil used in local refining is low. However, having a high legally permissible maximum might tempt suppliers responding to open international competitive bidding, particularly those from outside the region, to exploit this lenient specification and use one or more of these countries as "dumping grounds" for high-sulfur fuels.

Table 6 (West Africa) and Table 7 (East and Southern Africa) show the status of legal and institutional setups in the study countries. Only Senegal in West Africa and South Africa, Tanzania, and possibly Botswana in East and Southern Africa can be said to have reasonable to good systems. It is too early to draw conclusions on Kenya or Malawi where new regulators have very recently been established. The tables also show the results from *Doing Business 2010*, which tracks regulatory reforms aimed at improving the ease of doing business (World Bank 2009b). *Doing Business* ranks economies based on 10 indicators of business regulation that record the time and cost to meet government requirements in starting and operating a business, trading across borders, paying taxes, and closing a business; the rankings do not reflect such areas as macroeconomic policy, security, labor skills of the population, or the strength of the financial system or financial market regulations.

Table 6 Legal and Institutional Framework in Downstream Petroleum Sector in West Africa

	Burkina Faso	Cote d'Ivoire	Mali	Niger	Senegal
Ease of doing business ranking out of 183 countries (1=best, 183=worst)	147	168	156	125	157
Government Participation					
Refining	No refinery	69%	No refinery	No refinery	65%
Importing products	100%	100%	None	100%	Oversight
Logistics infrastructure	100%	Significant	Limited	100%	Limited
Marketing products	None	Limited	None	None	None
Strategic stocks	Yes	Yes	None	Yes	None
Existence of comprehensive legislation (comments)	No (only some disparate texts relating to price, licensing, and SONABHY attributions)	No (only disparate few texts relating to price, licensing, fraud, and safety)	No (only few recent texts regarding price, licensing, and ONAP attributions)	No (few texts regarding price, licensing, and SONIDEP attributions)	Yes (fairly comprehensive recent texts)
Existence of centralized, specialized downstream regulatory institution (comments)	No (old French model of commerce ministry for licensing and price and mines/energy ministry for technical issues)	No (DH under ministry does not do much per old French model; commerce ministry controls licensing)	Yes (but effectiveness is questionable)	No (old French model of commerce ministry for licensing and price and mines/energy ministry for technical issues)	Yes (although actual regulatory function appears weak)
Oversight and enforcement	Weak	Weak	Weak to moderate	Weak	Moderate

Sources: World Bank consultant interviews with government and industry officials, World Bank 2009b.
Note: DH = *Direction des Hydrocarbures* (Hydrocarbon Directorate)

Table 7 Legal and Institutional Framework in Downstream Petroleum Sector in East and Southern Africa

	Botswana	Kenya	Madagascar	Malawi	South Africa	Tanzania	Uganda
Ease of doing business ranking out of 183 countries (1=best, 183=worst)	45	95	134	132	34	131	112
Government Participation							
Refining	No refinery	50%	No refinery	No refinery	Significant	No refinery	No refinery
Importing products	0%	Oversight	None	None	None	None	0%
Logistics Infrastructure	None	Significant	None	Limited	Significant	Limited	None
Marketing products	None	Limited	None	None	Some	None	None
Strategic stocks	None	Limited	None	Unknown	Significant	Significant	Minor
Existence of comprehensive legislation (comments)	Not known (believed to be yes)	Under development	Yes (good texts but lacking enforcement provisions)	Yes (reported by OMCs to be good)	Yes (very comprehensive)	Yes (2008 Petroleum Act)	Yes (fairly comprehensive recent texts)
Existence of centralized, specialized downstream regulatory institution (comments)	No (but possibly within a proposed regulator)	Yes (within the independent ERC)	Yes	n.a. (MERA may have an oil branch)	NERSA's oil department deals only with pipelines; DME manages fuel specifications and pricing	YES (within the independent EWURA)	There is a Commissioner of Petroleum within the MEMD
Oversight and enforcement	n.a. (but probably good)	Weak	Weak	n.a. (probably weak)	Good	Good oversight, weak enforcement	Weak

Sources: World Bank consultant interviews with government and industry officials, World Bank 2009b.
Notes: n.a.= information not available, OMCs = oil marketing companies, MERA = Malawi Energy Regulatory Authority, NERSA = National Energy Regulator of South Africa, DME = Department of Minerals and Energy of South Africa, MEMD = Ministry of Energy and Mineral Development
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Pricing Policy

As the vertical integration in the industry began to break down in the 1960s, transaction prices at each stage in the supply chain, and in each global refining and trading center, gradually became known and published. As with any fungible commodity, arbitrage ensured that the quality-adjusted price of a liter of gasoline or any other petroleum product in one center differed from that in another by only slightly more than the marginal cost of transport. More recently, long-term contracts gave way to contracts where prices are typically based on spot international reference prices at the time of purchase.

Table 8 summarizes the main petroleum product pricing features of the 12 countries. Eight have price control, including all five West African countries. They use different variations of an import parity structure with international spot reference prices, market marine freight rates, and the dollar-local currency exchange rates as the three key short-term adjustment parameters.

A system of price control consists of two basic elements:

1. The price buildup structure, starting with import-parity landed costs and adding storage, transportation, margins, and other costs
2. The adjustment mechanism comprising short-term adjustment parameters, and the frequency of and the trigger for adjusting prices

With the exception of Malawi, the countries with price control adjust prices monthly. Malawi has a price stabilization fund and has no pre-set automatic adjustment frequency. The stabilization fund ran up a large deficit in 2008. Only in Botswana, Senegal, and South Africa is the price adjustment automatic, based on pre-established administrative procedures. In Burkina Faso, Côte d'Ivoire, Mali, and Niger, in spite of having a pre-established procedure, there is ad-hoc intervention in each adjustment.

Pan-territorial pricing by definition means that true costs are not reflected in market prices, and reduces incentives to minimize costs because offering lower prices by improving supply efficiency is not an option. In Mali, for example, prices are maintained uniform through tax differentiation. Fuels obtained in the lowest-cost manner are taxed most heavily, and conversely highest-cost fuels are taxed the least. This means that cost savings cannot be passed onto consumers, and a firm cannot lower prices in the hope of expanding its market share.

In West Africa, for the most part, the prices are maintained uniform throughout each country. The only minor exception is Burkina Faso which adjusts ex-depot prices at Ouagadougou (Bingo depot) and Bobo-Dioulasso, and has two sets of prices depending on the location. The countries with sector liberalization have regional price variations established by the market. One exception is Madagascar where the logistics operator—*Société Logistique Pétrolière SA*, a private firm that owns and controls all terminals and depots—provides a common "postage stamp" ex-depot price from all the depots in the country. Such a setup is unlikely to lead to a strong drive to increase efficiency and reduce cost.

Table 8 Pricing Policy

Country	Retail pricing	Basis	Main short-term adjustment parameters	Adjustment frequency and trigger	Political interference with frequency and trigger	Provision for regular review and adjustment of parameters such as margins	Pan-territorial pricing
Burkina Faso	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Monthly, automatic in principle but with ad-hoc intervention	Yes	No	2 sets of uniform prices depending on location
Côte d'Ivoire	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Monthly, automatic in principle but with ad-hoc intervention	Yes	No	Yes
Mali	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Monthly, automatic in principle but with ad-hoc intervention	Yes	No	Yes
Niger	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Monthly, automatic in principle but with ad-hoc intervention	Yes	No	Yes
Senegal	Controlled	Import parity	International spot prices, marine freight, and exchange rate	4 weeks, automatic	No	Yes	Yes
Botswana	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Monthly, automatic	No	Yes	No
Kenya	Liberalized	—	—	—	—	—	No
Madagascar	Liberalized	—	—	—	—	—	Yes
Malawi	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Ad hoc	Yes	n.a.	n.a.
South Africa	Controlled	Import parity	International spot prices, marine freight, and exchange rate	Monthly, automatic	No	Yes	No
Tanzania	Liberalized	—	—	—	—	—	No
Uganda	Liberalized	—	—	—	—	—	No

Sources: World Bank consultant interviews with government and industry officials
Note: — = not applicable, n.a. = information not available.

A recent review of developing country governments' response to the oil price volatility of the past two years showed that, against the severe price rises of 2007 and 2008, few governments were able to withstand the pressure to use or increase fiscal measures to lower prices (Kojima 2009b). As a result, some countries that moved to automatic price adjustment mechanisms years

ago suspended price adjustment and bore financial losses. In West Africa, four of the five study countries engaged in price smoothing during the run-up in international prices from 2007 through mid-2008. Only Senegal maintained a consistent automatic adjustment process. The adjustment timing and process steps to be taken every four weeks are defined in the 1998 sector restructuring legislation and have been rigorously followed.

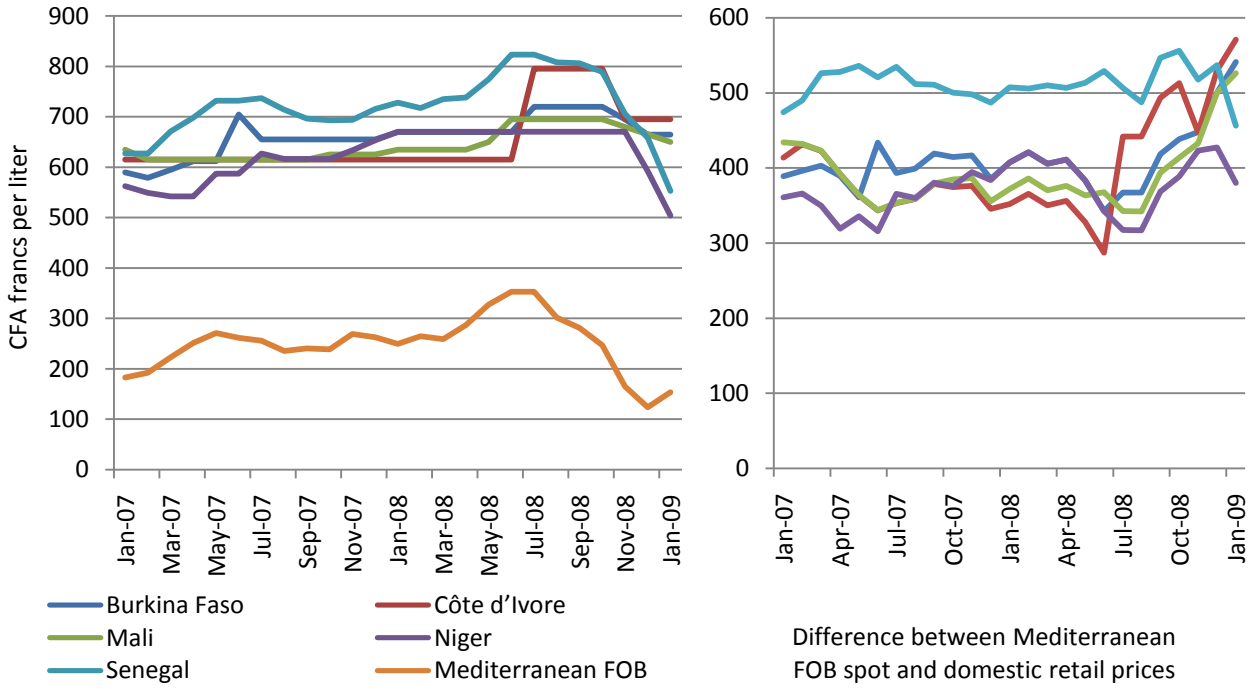
The other four countries, Burkina Faso, Côte d'Ivoire, Mali and Niger, suspended automatic price adjustment based on a clearly-defined import parity structure. Price stabilization was achieved through large fuel tax reductions (resulting in a loss of government revenue) or making the state supply company bear the financial losses.

An added positive element in Senegal's pricing regime is the provision built in to the legislation for a regular review of longer-term adjustment parameters such as distributor and retail margins. The other four countries still rely on an ad-hoc approach to such adjustments.

Figure 6–Figure 8 show monthly retail prices for gasoline, kerosene, and diesel in the five West African countries between January 2007 and January 2009. Also shown are the spot Mediterranean free-on-board (FOB) reference prices (left graph) and the differences between the retail prices and the spot Mediterranean FOB prices (right graph).

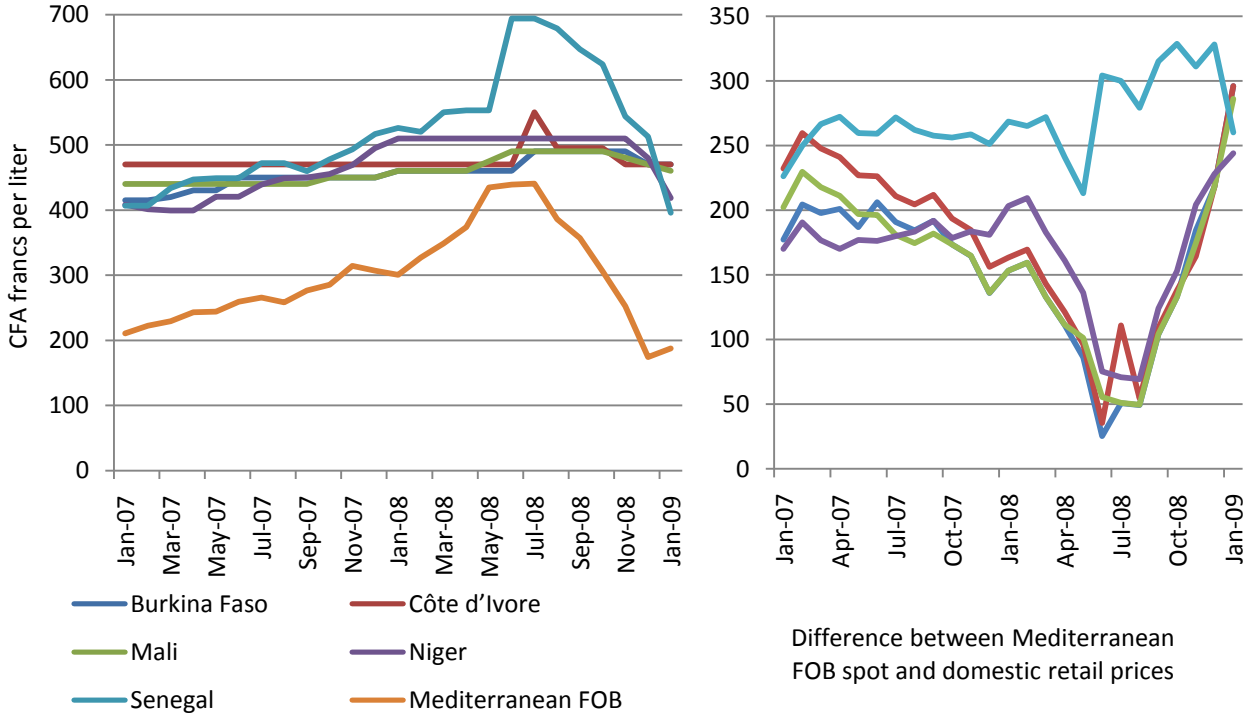
Attempts at stabilization are most pronounced for kerosene, a household fuel for lighting and cooking, followed by diesel and then by gasoline. This order follows the generally accepted social impact of different fuels. Gasoline is a fuel of the rich in low-income countries and tends to be subsidized the least (or alternatively taxed most heavily), while many countries regard kerosene as a "social fuel," and diesel to a lesser extent. Where stabilization became too costly and prices had to be raised, it is not clear that the shock to the economy following a large price adjustment, such as the one for diesel in Côte d'Ivoire in July 2008, was more than offset by the benefits of lower prices in the earlier months. As international prices began to fall rapidly in the latter half of 2008—the Mediterranean spot prices of the three fuels were lower in January 2009 than two years earlier—the countries tried to recover the losses suffered during the period of price smoothing and maintained relatively high prices, widening the differences between Mediterranean spot and domestic retail prices above the levels in early 2007.

Figure 6 Monthly Retail Gasoline Prices in West Africa



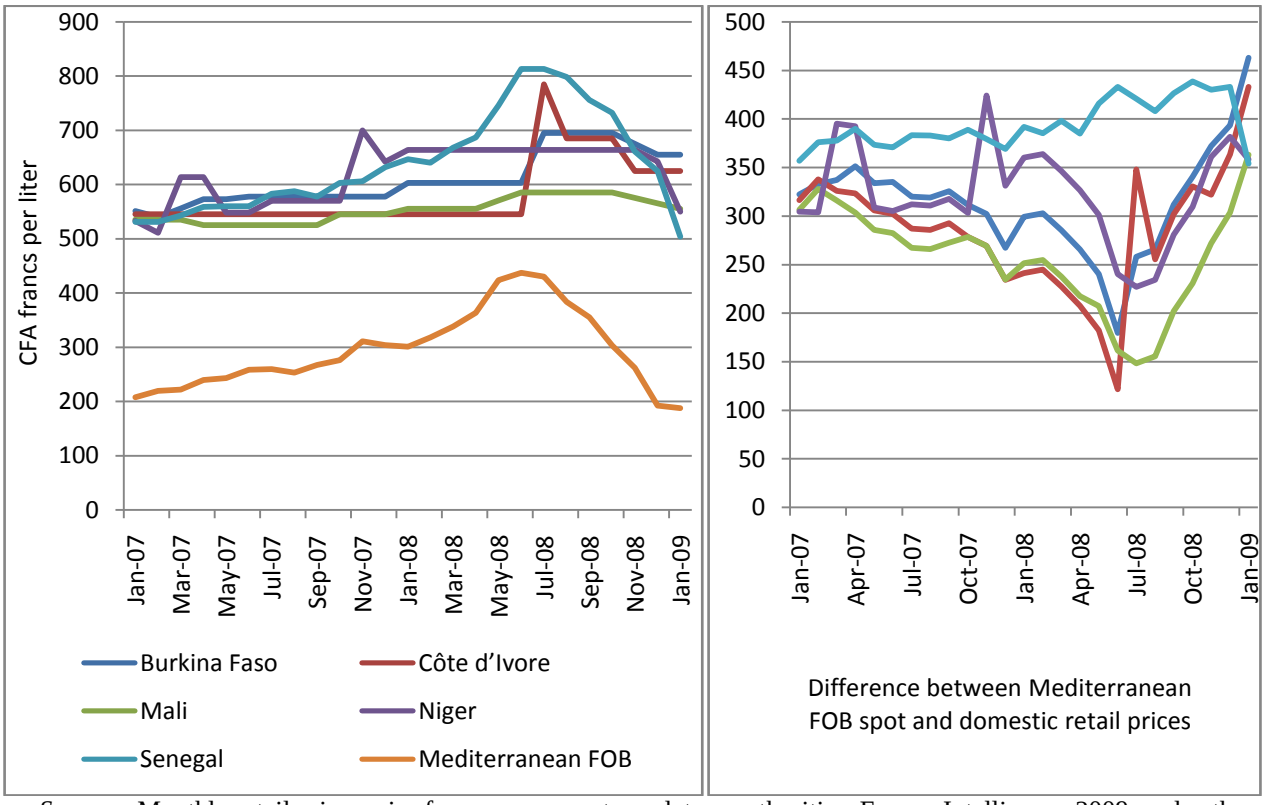
Sources: Monthly retail price series from government regulatory authorities, Energy Intelligence 2009, and authors' calculations.

Figure 7 Monthly Retail Kerosene Prices in West Africa



Sources: Monthly retail price series from government regulatory authorities, Energy Intelligence 2009, and authors' calculations.

Figure 8 Monthly Retail Diesel Prices in West Africa



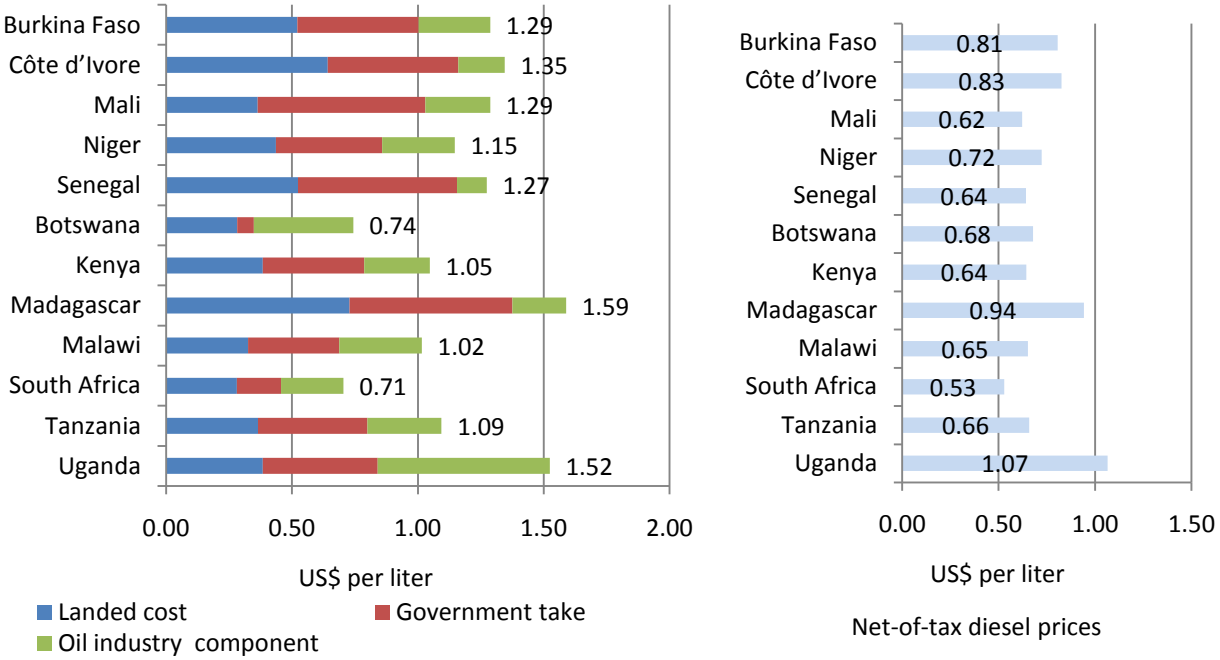
Sources: Monthly retail price series from government regulatory authorities, Energy Intelligence 2009, and authors' calculations.

Figure 9 and Figure 10 show the retail prices in early December 2008 for gasoline and diesel, respectively. The left graph shows three principal components:

1. Landed cost including cost, insurance, and freight, which covers the FOB price at the port from which the petroleum product is imported, marine freight and all freight/cargo-related costs, evaporation and other losses en route, and port fees to land the product in the pertinent receiving port, *or*, in countries with price control, hypothetical import-parity price corresponding to the landed cost used to calculate retail prices
2. Government take (referred to as tax hereafter), which includes all taxes, duties, and government fees that are incurred in the supply chain that go to the treasury or to earmarked funds
3. Oil industry component, which covers all gross margins for storage, inland bulk transport, local delivery, wholesale, and retail distribution.

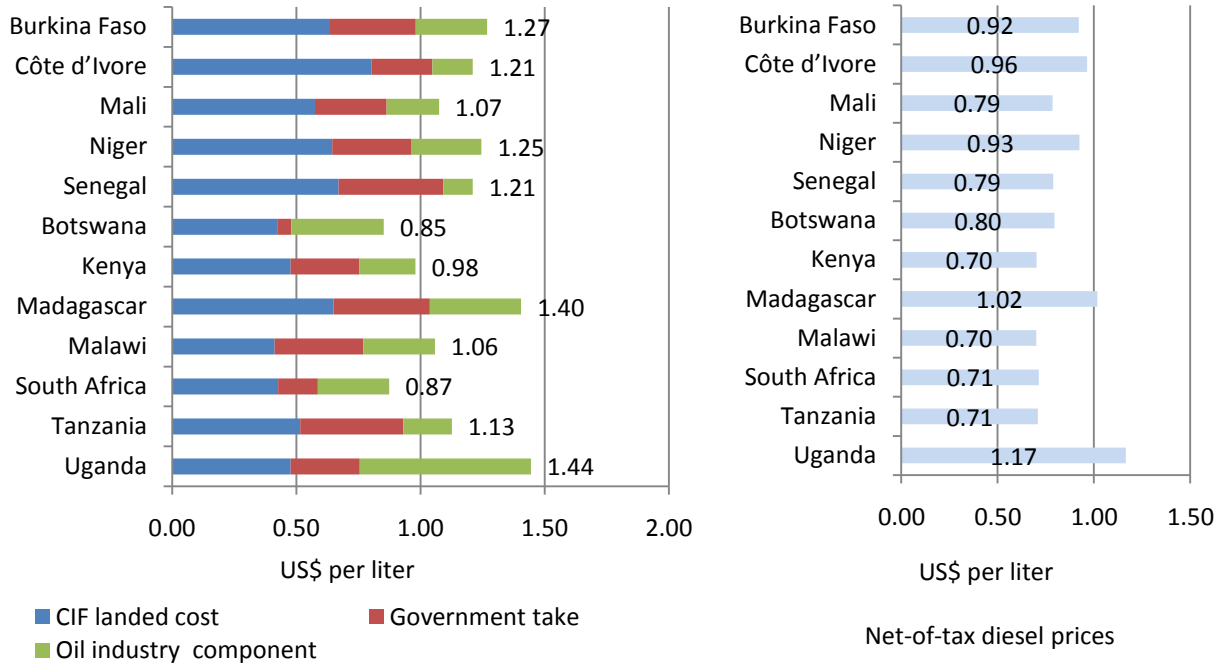
The difference between the retail selling price and the sum of the landed cost and government take represents the gross margin component available to the downstream petroleum industry. In markets where prices are liberalized, this number is derived by difference and is the least accurate of the three components. The right graph shows retail prices net of tax (government take), that is, the retail price minus component 2.

Figure 9 Retail Gasoline Prices in December 2008



Sources: Government regulatory authorities, World Bank consultant interviews with government and industry representatives, and consultant estimates.

Figure 10 Retail Diesel Prices in December 2008



Sources: Government regulatory authorities, World Bank consultant interviews with government and industry representatives, and consultant estimates.

The landed cost of gasoline at the primary coastal supply points range from a low of 28 U.S. cents a liter in Botswana and South Africa to a high of 73 U.S. cents a liter in Madagascar. The

range for diesel was slightly smaller, from a low of 41 U.S. cents a liter in Malawi to a high of 80 U.S. cents a liter in Côte d'Ivoire. As shown in Figure 6 and Figure 8, Côte d'Ivoire and Burkina Faso kept their ex-refinery and ex-depot prices, respectively, well above actual costs as world prices declined in late 2008, and these price stabilization strategies explain the relatively high landed prices in December 2008.

Excluding Côte d'Ivoire's artificially high numbers, Madagascar has by far the highest landed cost, more than double the average of the others. A possible explanation for Madagascar's high numbers is its relative isolation and often very small import parcels; further analysis would be needed to account for such a large difference.

Total government take showed greater variation than landed costs, varying nearly tenfold across countries for gasoline and eight-fold for diesel. The government take for gasoline ranged from a low of 7 U.S. cents a liter in Botswana to a high of 67 U.S. cents a liter in Mali and 65 U.S. cents a liter in Madagascar, and for diesel from 6 U.S. cents a liter in Botswana to a high of 42 U.S. cents a liter in Senegal and Tanzania. Taxes on petroleum products are a critical source of government revenue for low-income countries. The reason is that taxing fuel is one of the easiest ways to get revenue: collecting fuel taxes is relatively straightforward, and the consumption of fuels as a group is relatively price inelastic and income elastic, ensuring buoyant revenue as income rises and tax rates are increased (Bacon 2001). In setting tax rates on gasoline and diesel, many factors need to be considered. They include the government's revenue requirements, efficiency of resource use, the need to finance road maintenance, road congestion impacts, equity, the use of fuels in sectors other than transport, and the impact of the fuel tax structure on other economic activities and on the poor.

It is not possible to achieve all these objectives simultaneously through fuel tax policies alone. Most governments complement fuel taxation with other policy instruments, in particular to correct for externalities. The challenge of meeting the various objectives is especially difficult in low-income countries, where fewer policy instruments are available. In determining the levels and structure of fuel taxation, important compromises have to be made between the effects on government revenue generation, income distribution, the efficient use of roads, and environmental pollution. In so doing, attention must be accorded to the relative importance of each objective; the efficiency of fuel taxation as an instrument for achieving the objectives; and the magnitude of any perverse effects—such as adulteration of high-tax fuels with low-tax fuels—in relation to other aims (Gwilliam and others 2001).

Because the oil industry component is a residual value obtained by subtracting a sum of two estimated numbers from the retail price, it is the least accurate of the three components and hence comparison across countries should be treated with caution. Uganda's totals of 68 to 69 U.S. cents a liter stand out; they are almost double the next highest country, Botswana, at 37 and 40 U.S. cents a liter where there was a known temporary adjustment of between 20 U.S. cents a liter (for diesel) and 22 U.S. cents a liter (for gasoline). A higher industry component in a landlocked country compared with a coastal one is expected because of higher transport costs, but the values for Uganda are much higher than those in other landlocked countries under study where this component is in the range of 30 to 40 U.S. cents a liter. Uganda experienced fuel shortages in November and December of 2008 and this in part accounts for the high value of this component. The shortages were blamed on the new three-axle rule in Kenya, reducing the amount of fuel a truck could carry; delayed clearance of trucks at the Malaba border; and repairs on the Mombasa-Eldoret pipeline. Further, oil companies reported that they were still holding

stocks procured at the high international prices of July 2008 (Dow Jones Commodities Service 2008; Monitor 2008). More analysis would be required to understand why Uganda in December 2009 had a much higher oil industry component in U.S. dollars than other landlocked countries in the region.

An analysis and comparison of net-of-tax retail prices would normally be one of the first approaches to comparing basic cost structures across countries. Because many events can affect the net-of-tax prices, including inventory turnover and supply disruptions, observations that can be gleaned from a snapshot of price information at one point in time are limited. Since Mali and Niger used a reduction in taxes to stabilize prices earlier, it may be valid to compare the net-of-tax retail prices in these two countries with those in Senegal which did not stabilize. Such comparison shows that net-of-tax prices were close in Mali and Senegal but much higher in Niger. Burkina Faso and Côte d'Ivoire, in contrast, reduced prices charged by their state supply companies to stabilize, and hence during the period of cost recovery, in which December 2008 falls, net-of-tax retail prices would be expected to be high. Indeed, the net-of-tax prices are higher in Burkina Faso and Côte d'Ivoire than in Senegal—this despite the fact that Côte d'Ivoire is a coastal country just like Senegal—but the net-of-tax diesel price in Niger is not any lower than in these two countries. The high cost of transporting fuels to consumption centers in Niger may in part account for this finding, but more data on prices are needed to draw conclusions.

For both fuels, Madagascar and Uganda have the highest net-of-tax prices, followed by Côte d'Ivoire. South Africa at $0.53 a liter has the lowest cost structure for gasoline. For diesel, Kenya, Malawi, South Africa, and Tanzania were comparable at $0.70–0.71 a liter. At $0.64 a liter, Senegal has a gasoline cost structure slightly higher than Mali's at $0.62 a liter, while its net-of-tax diesel price is identical to that in Mali. As a coastal country, its net-of-tax price can be lower; the relatively high net-of-tax price in Senegal can be partially explained by the special fee—$0.07 a liter—being charged to amortize the refinery debt. Mali on average is relatively closer to the coastal supply points than Niger and hence it is reasonable to expect a lower cost structure. Mali's liberalized supply regime compared with Niger's state monopoly may also account for some of this difference in the cost structure.

Procurement

Partly on account of small market size, several countries in the study rely on a single buyer to import crude oil or petroleum products, presumably to take advantage of the resulting economies of scale. In Burkina Faso and Niger, a state-owned company has a legal monopoly over the importation and storage of petroleum products. Benchmarking analyses performed in the past in Burkina Faso on the import procurement performance of SONABHY—which uses a combination of procurement modalities including international competitive bidding, restricted tenders, direct purchases, and long-term contracts—suggest that it is efficient. *Société Nigérienne de Dépôt d'Essence et de Pétrole* (SONIDEP, Niger Oil and Gas Depot Company) in Niger uses a system of restricted tenders or direct-negotiated equivalents. SIR in Côte d'Ivoire has been assigned, by law, the monopoly right to handle all petroleum product imports. As a result, all petroleum products supplied to the domestic market—whether imported or refined by SIR—are channeled through SIR.

In Senegal, the SAR refinery can produce only about half of the country's requirements. Senegal purchases Nigerian crude under a state-to-state arrangement; the price is negotiated every three months and the government of Senegal pays the bill. The amount of petroleum products that need to be imported is assessed every 15 days by a committee—comprising representatives of the *Comité National des Hydrocarbures* (National Hydrocarbon Committee), a consultative body reporting to the Ministry of Energy; SAR; and all the licensed importers—which allocates the import entitlement to one or more operators.

Kenya, Madagascar, and Malawi have joint purchases of product imports. In Madagascar, oil companies voluntarily import on a joint cargo basis to minimize marine transport costs. In Malawi, Petroleum Importers Limited—a private company comprising all the four oil marketing companies operating in the country—handles all imports.

In Kenya, the government set up an Open Tender System to import crude oil for KPRL and petroleum products. Under the system, crude oil is purchased every month by a single company for the entire market on the basis of a public tender, transported through one terminal, and shared among all marketing companies in proportions to their share of the market. Petroleum products are similarly purchased through the Open Tender System. Depending on supply and demand, the oil marketing companies may source the balance of their needs independently.

The Open Tender System is intended to have the dual benefit of ensuring competitive prices (which are made public) and transporting the oil in a way that would minimize evasion of the import duty. Each company is required to take the crude oil allocation and pay for the consignment within a specified time frame or risk penalties for late payment. In times of high oil prices, some marketers could not pay on time for imports, and their late payments delayed subsequent crude shipments, lowered refinery throughout, and caused fuel shortages. Kenya imports enough petroleum products to accommodate three separate tenders a month, opening up the possibility of considering options other than the current Open Tender System where the right to import is granted to only one company.

Imports of petroleum products—and crude oil in the case of South Africa—to Botswana, Mali, South Africa, Tanzania, and Uganda is liberalized. There are various implicit restrictions on product imports into South Africa, which offer what amounts to protection to domestic refineries.

Policy toward Domestic Refineries

Among the refineries in the study countries, SAR in Senegal and KPRL in Kenya are acknowledged to be uneconomic and in need of protection. SIR in Côte d'Ivoire is given protection through addition of 5 percent to the import-parity equivalent price. A recent technical and financial audit of SIR identified investments in refinery processing and efficiency improvement/energy conservation that could eliminate the need for the 5 percent protection. As mentioned in the preceding section, South African refineries are effectively protected through product import restrictions.

SAR has recently come through a period of serious financial difficulties. In the years leading up to March 2006, its product revenues, based on costs of imported petroleum products, were not covering its crude oil and operating costs. The refinery accumulated some 85 billion CFA francs ($160 million) in debt by March 2006 and the financing of its crude supply was halted, forcing refinery closure for 11 months until February 2007 when a crude financing arrangement was

agreed with BNP Paribas. A fund, financed by the product price structure, to amortize the debt was established. The special charges in the price structure amount to 35 CFA francs ($0.07 based on the exchange rate prevailing in December 2008) per liter of white product and 25 CFA francs ($0.05) per kilogram of black product. The debt principal stood at 17 billion CFA francs ($34 million) in early 2009; the debt was fully repaid by the end of July. Looking to the future, SAR will need significant protection. A formula similar to that used in Côte d'Ivoire—where a percentage is added to the import-parity price—has been suggested; the percentage in Senegal would need to be much larger than the 5 percent used to protect SIR.

The government of Kenya provides protection to KPRL through the so-called base oil rule, whereby marketers are required to process about half of local consumption at the refinery according to their market share. The required amount was 70 percent until February 2009, when the government lowered the requirement to 50 percent in light of continuing operational problems faced by KPRL (KBC 2009). The processing fee charged by the refinery requires government approval. In September 2009, KPRL submitted an application to the Energy Regulatory Commission to increase the fee from KSh188 ($2.30) to KSh280 ($3.50) a barrel to cover rising operational costs and to raise funds for refinery modernization (*All Africa* 2009c).

Chapter 4: Observations

Small market sizes of the majority of the study countries, compared to requisite scale economy in the sector, make it difficult to achieve efficiency in the downstream petroleum sector. Problems in other sectors—such as power outages affecting refining and pipeline operations, or poor state of rail and road infrastructure and road—and limited capacity in low-income countries to develop and enforce a suitable legal framework in the petroleum sector pose additional challenges.

Fuel Shortage

Fuel shortages have had serious adverse effects on price levels in some parts of Sub-Saharan Africa. Among the study countries, landlocked Uganda in particular has repeatedly suffered from prolonged fuel shortages and price spikes—including the last three months of 2008 and the beginning of 2009 even as world oil prices fell sharply—due to disruptions in the supply chain from Kenya. Fuel shortages raise the prices of not only petroleum products but also of their substitutes. For example, kerosene and LPG shortages in Uganda in late 2008 and early 2009 pushed up the prices of charcoal, used in cooking, as some shops ran out of kerosene and LPG altogether (*All Africa* 2009a).

Fuel rationing is one possible immediate response to a shortage. Rwanda, which also imports petroleum products from Kenya, used fuel rationing effectively in January 2008 in response to supply disruptions following the Kenyan elections. The government limited gasoline sales for small cars to 10 liters and for jeeps to 20 liters a day (BBC 2008). Fuel rationing was ordered again at year's end, this time because of a regional fuel shortage again originating in Kenya. Gasoline sales were limited to an equivalent of 20 liters per vehicle (*All Africa* 2008). These steps appear to have helped avoid the large price fluctuations observed in the neighboring countries.

Over the longer term, ensuring sufficient fuel stocks is an often-used mechanism to protect against supply disruptions. There is a large cost associated with establishing such stocks, and as a result even when there is a plan to establish security storage capacity the plan is not necessarily implemented for lack of financing. But there are also costs to the economy of fuel shortages. Assessing the costs and benefits of maintaining contingency stocks—and deciding how large, who maintains, and who pays—is important. The value of maintaining some contingency stocks is universally accepted. Globally, according to a report published in October 2009 by Global Markets Direct, oil storage capacity rose from 2.39 billion barrels in 2000 to 2.96 billion barrels—or about a tenth of world annual oil consumption—in the first half of 2009 (BMI 2009).

Several governments in this study have assigned agencies in charge of security stocks: SONABHY in Burkina Faso, *Société de Gestion des Stocks de Sécurité* in Côte d'Ivoire, the National Oil Corporation of Kenya, *Office National des Produits Pétroliers* (National Office for Petroleum Products) in Mali, SONIDEP in Niger, the Central Energy Fund in South Africa, and Tanzanian Petroleum Development Corporation. Malawi's Minister of Natural Resources, Energy, and Environment reported recently that the government planned to establish a national oil company aimed at ensuring the security of supply of petroleum products (Xinhua 2009). Senegal has a 1998 decree fixing the modalities for maintaining security stocks. Botswana sub-contracts maintenance of contingency stocks to two oil marketing companies. The government of

Uganda announced a plan in early 2009 to build a fuel depot in Kampala with a capacity of 150 million liters.

Refining

Small hydroskimming refineries worldwide are finding it difficult to be financially viable. There is a cost to the economy in providing protection to such refineries; the costs are paid either by the government, if there is a subsidy to refineries, or by consumers. SAR in Senegal, KPRL in Kenya, and SIR in Côte d'Ivoire are given explicit protection. In Senegal, the cost is high—currently $0.07 a liter, which is equivalent to $11 a barrel—but even that is not adequate to make SAR commercially viable in the long run because the refinery is too small. For East Africa, there is competition from not only large, complex refineries in the Persian Gulf but increasingly from very large, complex export-oriented refineries in Asia.

Uneconomic refineries are protected for a variety of reasons, such as enhancing the security of supply, creating jobs, and maintaining technical skills. In countries with no domestic oil, however, it is not clear that importing crude oil and refining it enhances supply security any more than importing refined products. On the contrary, it could even be argued that relying on one refinery diminishes supply security, especially if it experiences operational disruptions frequently as recent experience with KPRL in Kenya shows. As for job creation, refining does not generate much employment. Valero, the largest refiner in the United States with 15 refineries, employs on average about 510 workers at each refinery, which has an average size of 200,000 barrels a day (World Bank 2008a). The extent of technology-enhancing benefits of maintaining a small hydroskimming refinery is also questionable.

It may be politically difficult to allow a refinery to shut down, particularly if it is state-owned, but many countries have allowed market forces to close inefficient, uncompetitive refineries. In the study countries, both Madagascar and Tanzania used to have refineries that are no longer operating. The experience of the U.S. refining industry offers a stark illustration. The average refinery size in the United States in 1969 was 42,000 barrels a day. In 1982, the *Oil and Gas Journal*'s "Worldwide Refining Survey" found 301 refineries in the United States; by January 2008, the number had declined to 131, with an average size of 133,000 daily barrels. In the intervening years, 170 refineries—more than half of the refineries that existed in 1982—had been shut down and replaced by fewer, much larger refineries through expansion of existing refineries.

"Natural Monopoly"

There are economies of scale in shipping crude oil and petroleum products, making it costly to import products in small parcels. It is therefore not surprising that the four smallest markets in the study—Niger, Malawi, Burkina Faso, and Madagascar—have all adopted what amounts to a single-buyer model. It is encouraging that one monopoly supplier that has been analyzed, SONABHY of Burkina Faso, has been assessed to be performing at close to a best-practice level in importation. Similar benchmarking analyses of other monopoly suppliers, as well as storage handling of SONABHY and others, would be useful to identify if there is scope for cost reduction.

Pipelines in particular as well as large petroleum product storage terminals in small markets constitute natural monopolies. Competition can be enhanced through third party access while monopoly rents can be reduced by economic regulation.

Transporting Petroleum Products

Transporting crude oil to domestic refineries in countries with refining capacity, and petroleum products from refineries—whether domestic or overseas—to final destinations in all countries can comprise a significant fraction of end-user prices, particularly in markets far from major refining centers.

Economies of scale involved in shipping have been treated earlier. Slow border clearance adds to the cost and has even caused fuel shortages. Waiting to discharge fuels at ports is particularly expensive. Demurrage is excessive at the modern Kurasini Oil Jetty in Tanzania, with the average discharge rate of 353 m^3 an hour in the first ten months of 2008, compared to the design discharge rate of 700. The main reason for the slow discharge is the Tanzania Revenue Authority's installation of flow meters to verify volume—instead of the almost-universally used tank dips—which have suffered from frequent breakdowns (EWURA 2008). Given the cost of excessive demurrage, priority attention should be given to addressing this problem, including possibly assessing other means of preventing fraud. Improving the efficiency of the Dar es Salaam port administration, including that of the Tanzania Revenue Authority, could lead to measurable savings.

In terms of cost per liter of fuel transported over land, the least expensive—provided that the requisite economies of scale are achieved—is pipeline transport (except for fuel oil, which would need to be heated to be pumped), followed by rail, and finally by truck. Only Kenya and South Africa have pipelines. There are medium-to-long term prospects for establishing a petroleum product pipeline system in Côte d'Ivoire, Burkina Faso, and Mali. Road transport is not allowed in Kenya for the domestic market or for exports if pipeline capacity exists. The operation of the pipeline system in Kenya has been disrupted by power outages. Undertaking pipeline repairs has also reduced the volume of fuel shipped and caused shortages in the neighboring countries importing petroleum products from Kenya. Inadequate and unreliable supply of power is a chronic problem in Sub-Saharan Africa and adversely affects fuel supply by disrupting pipeline and refining operations. This is an example of problems outside the petroleum sector having serious negative effects on sector efficiency and costs.

There is scope for making greater use of rail. The line connecting Senegal and Mali requires investment to improve its physical state and quality of service. While the Dakar-Bamako railway line continues to be in poor state, road conditions from Dakar to Mali have been improving, offering a viable alternative to rail and further shifting the mode of transport away from rail. Pan-territorial pricing in Mali, whereby petroleum products sourced in the least-cost manner are simply taxed more to achieve the same price throughout the country, provides no incentive to press for rail rehabilitation and revival, or cost reduction in general. In Madagascar, the market-based rate for road movements is more than 50 percent higher than that using rail, yet only 28 percent was transported by rail and more than 70 percent by road in 2008. Madarail is now in a position to transport 40 percent or more of the volume moved and achieve cost savings.

Road transport is hampered by poor road conditions, congestion, and, where cross-border trade is involved, slow border clearance in some situations. More effective enforcement of load limits

across the road freight sector will benefit road transport in the long run by reducing road damage, enhancing traffic safety, and eventually enabling use of larger and more efficient trucks (which require much better road conditions). Although enforcing the three-axle rule in Tanzania and Kenya may have had short-term costs, long-term benefits—if accompanied by road improvement as well as other enforcement measures—should outweigh these costs.

Competition

Effective competition in a small petroleum market is difficult to achieve. One danger is that there being too few firms, resulting in implicit price collusion. For this reason, some governments exercise economic regulation, for example by imposing price ceilings. Having many more firms does not necessarily enhance efficiency if they are individually too small.

Third-party access to storage terminals and other large infrastructure can enhance competition and reduce costs. Such access is not granted in Côte d'Ivoire and Niger, and is restricted in Botswana, Malawi, and South Africa.

Fair and healthy competition would be difficult to achieve if commercial malpractice is tolerated. Tax evasion is a serious concern in East Africa to the point where port clearance has been slowed down by inspection. In its 2008 annual report, the EWURA in Tanzania reported that 60 percent of the 189 samples taken at retail outlets and 77 percent of the 13 samples taken at depots failed product quality tests in 2007/08. The EWURA increased penalties for commercial malpractice, including fuel adulteration, in August 2007 and plans to use modern testing techniques to curb adulteration (EWURA 2008).

It goes without saying that an important step is reducing incentives for engaging in commercial malpractice to the extent possible. The incentive in turn depends on the relative benefit and cost (from the risk of being caught and fined or having one's business license revoked). One effective market-based approach is the practice in many industrial countries whereby oil companies market at retail and assume responsibility throughout the supply chain to guarantee fuel quality and quantity in order to protect their public image and market share.

Price Control

As the world economy recovers and demand for oil rebounds, the oil market may go through another cycle of price shocks. It is therefore important that the four West African countries that engaged in ad-hoc price stabilization schemes during the 2007–2008 price run-up define more clearly the rules beforehand so that the impact on the state companies or the national treasury can be mitigated.

In Mali, equalization of prices of fuels obtained from different sources through differential taxation substantially reduces the incentives to minimize costs. It would be useful to consider other means that do not interfere as much with market incentives.

The size of the South African market is sufficiently large that the country should be able to dismantle its price control, liberalize oil product supply, and achieve effective competition.

Overall Legal Framework and Enforcement

Burkina Faso, Côte d'Ivoire, Mali, and Niger need to update and strengthen their legal and regulatory frameworks. With the exception of Botswana and South Africa, the study countries suffer from weak enforcement and policing, even in those countries where a strong legal and institutional framework has been established. Inadequate regulations and weak enforcement allow too many oil marketing companies to operate in the three East African countries. This overwhelms limited enforcement capacity, making commercial malpractice an attractive way of making profits. The remedy, in a liberalized market, is not to limit these companies by number but to ensure that the licensing criteria for operators are stringent and that compliance with rules to obtain and retain the licence is enforced.

One approach is to establish a separate body for inspection and enforcement, as in other developing regions such as South America where strong, specialized, independent inspection institutions have been developed. These institutions have encouraged the formation of a cadre of private, certified inspectors, to which the work is outsourced from the enforcement institution, minimizing its requirement for permanent staff.

Senegal has already identified the need to update the legal texts developed as part of the 1998 reform, particularly in the areas of product specifications, open access, security stocks, and regulatory institution building. Senegal plans to convert *Comité National des Hydrocarbures* into a regulatory body *Organe de Régulation des Activités du segment aval du sous-secteur des Hydrocarbures* (Regulatory Body for Downstream Hydrocarbon Sub-Sector Activities).

Côte d'Ivoire has more trained staff in the ministry than other West African countries studied. With such absorptive capacity, the government is in a position to consider a medium-term measure to define a regulatory, enforcement, and institutional approach for the sector and begin to staff and train. Over the long term, Senegal has the capacity to make good use of training and technical assistance for institutional building and reinforcement, including the development of a cadre of independent certified inspectors for the sector.

An assessment of the cost-effectiveness of Kenya's Open Tender System managed by the Ministry of Energy, given volumes of imports can easily justify more than one tender a month, may be useful. The Open Tender System for crude oil is linked to the requirement that all oil marketing companies process crude oil at KPRL. Consideration may be given to applying modest duty protection, for example of the order of 5 percent, to the refinery and liberalize product imports, allowing competition between domestic refining and imports.

Madagascar might consider amending its legislation to give the *Office Malgache des Hydrocarbures* (Madagascar Office of Hydrocarbons), which is responsible for providing oversight of the sector, the powers to require efficiency from both the Galena Refinery Terminal and the *Société Logistique Pétrolière S.A.* and the resources to enforce compliance with the legislation.

Information about the downstream sector—about prices and price structure, sources and volumes of imports, differences between domestic and international prices, companies operating in the country—is not readily available in many study countries. One of the most important roles of government is to collect and make market information available, to inform both suppliers and purchasers. If the public is well informed, it becomes more difficult to ignore sector inefficiencies. The EWURA in Tanzania provides up-to-date detailed prices throughout the

country twice a month on its Web site. Where there are charges of price collusion and pressure on government to re-introduce price control, as has happened in Kenya, it would be useful to have historical price information available to the public so that perceptions can be checked against actual price trends. Historical prices in countries where prices are not controlled require price surveys and can be resource-intensive to collect. But the government agency in charge of the sector can begin by collecting price information in the capital city, building a database, and, in due course, extending data collection to other major cities.

Valuation of Cost Reduction Potential in West Africa

This study undertook a rapid assessment of possible investment and efficiency enhancing projects that could reduce supply costs in West Africa. Table 9 summarizes the findings.

Table 9 Valuation of Potential Cost Reduction Measures in West Africa

Country	Cost-reduction measures	Retail price savings, CFA francs/liter	Savings in % of 2007-08 retail price	Annual savings in billion CFA francs	Annual savings in $ million
Burkina Faso	10% Reduction in SONABHY's gross margin through implementation of efficiency measures/investments in depot management and overall administration identified in an audit/benchmarking study, follow-up investment estimated to cost $3-5 million	3	0.5	1.7	3.7
Côte d'Ivoire	5% Reduction in import parity through elimination of SIR protection following an estimated $150 million refinery logistics investment/efficiency program	15	2.5	16.5	36
Mali	True liberalization of product supply; elimination of cost equalization; 80% of supply assumed from cheapest source, 20% from present mix.	42	7.5	35.7	78
Niger	10% Reduction in SONIDEP's gross margin through implementation of efficiency measures/investments identified in an audit/benchmarking study; follow-up investment estimated to cost $3-5 million	3.4	0.5	0.7	1.5
Senegal	10% reduction in import parity through either a $480 million SAR efficiency/investment program or switching entirely to petroleum product import; estimated $30–35 million for improving LPG import and storage	30	4.6	58.5	13

Source: World Bank consultant's analysis and estimates.

As mentioned earlier, a benchmarking study has identified investment options for SIR that could make the refinery competitive with product imports without the current protection amounting to 5 percent. For the purpose of this exercise, SAR is considered to have a cost structure that is at least 10 percent higher than efficient import-parity price levels. The risk associated with the $480 million investment in SAR is high; the half-a-billion-dollar project will make the refinery marginally competitive with direct product imports. Switching entirely to product imports requires much less investment. Senegal has a need to improve the infrastructure for receiving and storing LPG. This study estimates the cost to be in the range of $30–35 million.

An audit/benchmarking study of the state-owned supply/storage companies in Burkina Faso and Niger could be used to identify ways of improving the efficiency of SONABHY and SONIDEP. SONABHY has been examined for procurement performance and has been found to be close to best practice but has not been benchmarked for other activities. SONIDEP has not been benchmarked. In both cases, this assessment assumes that a reduction of 10 percent in the gross margins of the respective companies can be achieved.

In addition, each country could benefit from training and technical assistance in legal, institutional, and enforcement. Supporting five years of such activities could cost about $10 million.

Conclusions

There are varying degrees of scope for reducing the cost of supplying petroleum products in the study countries. A clear burden on the economy is protection of domestic refineries that cannot compete with direct product imports. Refinery closure is often politically sensitive, especially if the refinery is government-owned, but Madagascar and Tanzania have closed their refineries. Globally, the trend over the past three decades has been to replace numerous small, simple refineries with fewer, larger, and more complex ones.

Pipelines are most cost-effective but require large upfront capital investments, a reliable supply of electricity—unreliable and inadequate power is among the most serious problems in the energy sector in Sub-Saharan Africa—and regular maintenance. While challenging, over the long term, shifting to pipeline transport will reduce costs in many countries. Greater use can be made of rail to reduce costs. This requires rehabilitation and expansion of existing lines in some cases. One obstacle to greater rail use is ownership of trucking business by oil marketing companies, particularly in West Africa. In the near term, Madagascar is perhaps best position to expand the share of petroleum products moved by rail, since there is spare capacity that can be readily mobilized.

Universal overloading of vehicles and poor road and vehicle conditions go hand in hand. They deter professional fleet management committed to safety and on-time delivery, and use of longer and more fuel-efficient modern trucks capable of carrying as much as 60 tonnes used in Europe and elsewhere; these large modern trucks require much better road surfaces. Coordination with other sectors to gradually improve road conditions and vehicle technology can reduce costs over the long run.

Assessment of procurement procedures such as the Open Tender System in Kenya; port clearance procedures, particularly in Tanzania; and performance by monopoly suppliers in Burkina Faso, Côte d’Ivoire, Madagascar, and Niger may find alternatives that are less costly.

Where price control is in effect, identifying aspects that reduce the incentive to minimize costs and substituting them with alternatives that distort the market less could enhance efficiency. South Africa, which is a large market, may benefit from more competition and less price regulation.

There is a need to strengthen monitoring and enforcement of rules already in place in most study countries. Commercial malpractice, if unchecked, can take over the market and drive out efficient operators known not to engage in fraud. Short-selling transfers money rightly due to consumers to fraudulent operators. Other forms of fraud can be even most costly, especially if equipment or vehicles are damaged as a result.

Few governments in Sub-Saharan Africa make key sector data regularly available in a timely manner. Although resource-intensive, especially in countries with liberalized prices, such information empowers consumers and enables informed debates about prices and sector efficiency. Making price and other data widely available has taken on greater importance in recent years against the backdrop of soaring international oil prices and calls from different quarters in many countries for greater price control to protect consumers. Madagascar, South Africa, and Tanzania have been posting historical prices and other information on the internet. The challenge is for other countries to begin to collect similar information and make it publicly available.

References

All Africa. 2008. “Fuel Crisis—Gov’t Opts for Petrol Rationing.” December 16.

———. 2009a. “Uganda: Kerosene, Cooking Gas Shortage Hits Country.” January 9.

———. 2009b. “Essar Appoints CEO to Oversee Refinery Upgrade.” September 1.

———. 2009c. “New Refinery Fee Sets Stage for Rise in Petroleum Prices.” September 15.

Bacon, Robert. 2001. “Petroleum Taxes.” *Viewpoint* Note 240. http://rru.worldbank.org/Documents/PublicPolicyJournal/240Bacon-831.pdf.

Bacon, Robert, and Masami Kojima. 2008. *Coping with Oil Price Volatility*. ESMAP Energy Security Special Report 005/08. Washington DC: World Bank. http://esmap.org/filez/pubs/8142008101202_coping_oil_price.pdf.

BBC (British Broadcasting Corporation). 2008. “Rwanda Issues Strict Fuel Rationing Regulations over Kenyan Crisis.” January 4.

BMI (Business Monitor International). 2009. “Saudi Aramco To Discuss Joint Crude Storage At Okinawa.” *Daily Oil and Gas Alert*, November 25.

Daily Nation. 2009. “Oil Refinery Loses Monopoly.” Feb. 11.

Dow Jones Commodities Service. 2008. “Uganda Hit By Fuel Shortage; Prices Double In 1 Wk – Officials. December 30.

East African. 2007. “Govt Explores Dar Option to Solve Diesel Crisis.” May 8.

Energy Intelligence. 2009. Oil Market Information database. Online subscription database.

ESMAP. 2005a. “The Impact of Higher Oil Prices on Low Income Countries and on the Poor.” Report 299/05. Washington DC: World Bank. http://go.worldbank.org/U2VG014D80.

———. 2005b. “The Vulnerability of African Countries to Oil Price Shocks: Major Factors and Policy Options. Report 308/05. Washington DC: World Bank. http://go.worldbank.org/5F6JNZAYO3

EWURA (Energy and Water Utilities Regulatory Authority). 2008. Annual Report. www.ewura.com/petroleum.html.

Foster, Vivien and Cecilia Briceño-Garmendia. 2010. *Africa’s Infrastructure*. Washington DC: World Bank. www.infrastructureafrica.org/aicd/flagship-report.

Gwilliam, Kenneth, Robert Bacon, Masami Kojima, and Kseniya Lvovsky. 2001. “Transport Fuel Taxes and Urban Air Quality.” Pollution Management in Focus Discussion Note No. 11. www.thepep.org/ClearingHouse/docfiles/transport_fuel%20taxes.pdf.

IEA (International Energy Agency). 2009a. *World Energy Outlook 2009*. Paris.

———. 2009b. “The Electricity Access.” World Energy Outlook online database. www.worldenergyoutlook.org/database_electricity/electricity_access_database.htm.

IHS Global Insight Daily Analysis. 2009. “Expected Cost of Kenya-Uganda Pipeline Rises to US$250 mil.” October 12.

Kenya Broadcasting Cooperation. 2009. “Govt Admits Refineries Lack Quota Capacity.” February 10.

Kojima, Masami. 2009a. *Change in End-User Petroleum Product Prices: A Comparison of 48 Countries*. Extractive Industries and Development Series #2. Washington DC: World Bank. http://siteresources.worldbank.org/INTOGMC/Resources/ei_for_development_2.pdf.

———. 2009b. *Government Response to Oil Price Volatility: Experience of 49 Developing Countries*. Extractive Industries and Development Series #2. Washington DC: World Bank. http://siteresources.worldbank.org/INTOGMC/Resources/10-govt_response-hyperlinked.pdf.

Kpodar, Kangni. 2006. “Distributional Effects of Oil Price changes on Household Expenditures: Evidence from Mali”. IMF Working Paper WP/06/91. Washington, DC: International Monetary Fund. www.imf.org/external/pubs/ft/wp/2006/wp0691.pdf.

Monitor. 2008. “Fuel Prices Have Shot up But Will Come Down.” November 3.

Oil and Gas Journal. 2008. “2008 Worldwide Refining Survey.” December 22.

World Bank. 2008a. “Refining Crude Oil – Part 1.” Petroleum Sector Briefing Note No. 10. Phnom Penh: World Bank. http://siteresources.worldbank.org/INTOGMC/Resources/cambodia_oil_gas_newsletter_10.pdf.

———. 2008b. “Refining Crude Oil – Part 2.” Petroleum Sector Briefing Note No. 11. Phnom Penh: World Bank. http://siteresources.worldbank.org/INTOGMC/Resources/cambodia_oil_gas_newsletter_11.pdf.

———.2009a. *World Development Indicators*. September. Subscription online database.

———.2009b. *Doing Business 2010: Overview*. www.doingbusiness.org/Documents/DB10_Overview.pdf.

Xinhua. 2009. “Malawi gov’t to establish national oil company.” October 6.

ANNEXES

Annex Abbreviations and Acronyms

AACGR	Average annual compound growth rate
Actg	Acting
AG	Arabian Gulf
AGO	Automotive gasoil
ARA	Amsterdam, Rotterdam, Antwerp
BBC	British Broadcasting Corporation
C & F	Cost and Freight, i.e. excluding insurance
Cap	Capacity
CI	Côte d'Ivoire
CIF	Cost, insurance and freight
CNH	Comité National des Hydrocarbures (Senegal)
CPI	Consumer price index
DH	Direction des Hydrocarbures (Côte d'Ivoire)
DME	Department of Minerals & Energy (South Africa)
DNGM	Direction Nationale de la Geologie et des Mines (Mali)
DNTTMF	Direction Nationale des Transports Terrestres, Maritimes et Fluviales (Mali)
DPK	Dual purpose kerosene
DRC	Democratic Republic of Congo
E & SA	East and Southern Africa
e-m	Electronic mail
ENCON	Energy Conservation and efficiency studies in industrial plants
ERC	Energy Regulatory Commission (Kenya)
ESMAP	Energy Sector Management Assistance Program
EWURA	Energy & Water Utilities Regulatory Authority (Tanzania)
FOB	Free on Board
FSIPP	Fonds de sécurisation des importations de produits pétroliers (Senegal)
GDP	Gross Domestic Product
GESTOCI	Société de Gestion des Stocks de Sécurité (Côte d'Ivoire)
GoK	Government of Kenya
HHI	Herfindahl-Hirschman Index

HS	High sulfur
i.t.o.	In terms of
IBLC	In bond landed cost, i.e. CIF cost + discharge
ICB	International Competitive Bidding
IDO	Industrial diesel oil
IEA	International Energy Agency
IK	Illuminating kerosene
IP	Illuminating paraffin
IPP	Import Parity Price
JKIA	Jomo Kenyatta International Airport (Kenya)
KAA	Kenya Airport Authority
KBS	Kenyan Bureau of Standards
KOJ	Kurasini Oil Jetty in Dar es Salaam
KOSF	Kipevu Oil Storage Facility in Mombasa
KPC	Kenya Pipeline Company
KPRL	Kenya Petroleum Refineries Ltd.
KRA	Kenya Revenue Authority
K-U pipeline	Kenya - Uganda pipeline
LPG	Liquefied petroleum gas
LPSA	Société Logistique petrolière S.A.
max.	Maximum
MD	Managing Director
Med	Mediterranean
MEIC	Ministry of Economy, Industry and Commerce (Mali)
MEMD	Ministry of Energy and Mineral Development (Uganda)
MERA	Malawi Energy Regulatory Authority
MME	Ministère des Mines et de l'Energie (Côte d'Ivoire)
MMEWR	Ministry of Minerals, Energy and Water Resources (Botswana)
MoE	Ministry of Energy (Kenya)
MSTT	Pooled OMC Storage in Côte d'Ivoire
n.a.	Not available
NBR	Number

NERSA	National Energy Regulator of South Africa
NOCK	National Oil Company of Kenya
NWE	Northwest Europe
OMC	Oil Marketing Company
OMH	Office malgache des hydrocarbures
ONAP	L'Office National des Produits Pétroliers (Mali)
ORAH	Organe de Régulation des Activités du segment aval du sous-secteur des Hydrocarbures" (Senegal)
ORITA	Oliver R Thambo International Airport (South Africa)
OTS	Open Tender System
p.a.	Per Annum
PETROCI	Société Nationale d'Operations Pétrolières (Côte d'Ivoire)
PIEA	Petroleum Institute of East Africa
PIL	Petroleum Importers Ltd. (Malawi)
P/L	Pipeline
PMS	Premium motor spirits
PPP	Purchasing Power Parity
PS	Permanent Secretary
RMS	Regular motor spirits
RON	Research Octane Number
RoW	Right of way
RR	Railway
RSA	Republic of South Africa
SA	South Africa
SACU	Southern African Customs Union
Sahel	Arid African region on southern fringe of the Sahara desert
SAPIA	South African Petroleum Industry Association
SAR	Société Africaine de Raffinage (Senegal)
SBM	Single buoy mooring facility
SIR	Société Ivoirienne de Raffinage (Côte d'Ivoire)
SMB	Société Multinationale de Bitume (Côte d'Ivoire)
SONABHY	Société Nationale Burkinabè d'Hydrocarbures
SONACOP	Société Nationale de Commercialisation de Produits Pétroliers (Benin)

SONIDEP	Société Nigérienne de Dépôt d'Essence et de Pétrole (Niger)
SSA	Sub Saharan Africa
STSL	Société Togolaise de Stockage de Lomé (Togo)
T&TA	Training and Technical Assistance
TBS	Tanzanian Bureau of Standards
TIPER	Tanzanian and Italian Petroleum Refining Co Ltd
TOR	Terms of Reference
TPDC	Tanzanian Petroleum Development Corp.
UBS	Uganda Bureau of Standards
UK	United Kingdom
UN	United Nations
UNL	Unleaded
VAT	Value Added Tax
Vs	Versus
WAfr	West Africa, referring to the specific 5 study countries
WDI	World Development Indicators (World Bank Data Base covering 209 countries)
white products	gasolines and middle distillates

Annex Units

10^3 m^3	thousands of cubic metres
10^6 m^3	millions of cubic metres
Ary	Madagascar Ariary
b/sd	barrels per stream day
US$	United States Dollar
b/cd	barrels per calendar day
b	barrels
cSt	centistokes
dwt	deadweight tonnes
F CFA	CFA franc
km	kilometre(s)
KShg	Kenya shilling
L	Liter(s)
MKwa	Malawi Kwacha
m^3	cubic metre(s)
Rds	South African Rands
SA¢	cents of a South African Rand
Shg	shilling
t	tonne(s) = metric ton(s)
10^3	thousand(s)
10^6	million(s)
tpa	tonnes per annum
TShg	Tanzania shilling
UShg	Uganda shilling

Annex 1 Organizations Met and Web-based Information Used

Côte d'Ivoire

Government of Côte d'Ivoire

Ministry of Mines and Energy, Direction of Hydrocarbons

State Companies

Société Ivoirienne de Raffinage (SIR)

Société de Gestion de Stocks de Côte d'Ivoire (GESTOCI)

Private Sector Oil Product Distributors

TOTAL

SITARAIL

Burkina Faso

Government of Burkina Faso

Ministère du Commerce, de la Promotion de l'Entreprise et de l'Artisanat

Ministère des Mines, des Carrières et de l'Energie

State Companies

Société Nationale Burkinabé des Hydrocarbures (SONABHY)

Private Sector Oil Product Distributors

ADDAX & ORYX GROUP

Burkina & SHELL

PETROFA

SKI

TOTAL

Chambre de Commerce et d'Industrie du Burkina Faso

Embassy of Canada, Burkina Faso

Niger

Government of Niger

Ministere du Commerce, de l'Industrie et de la Normalisation

Ministere des Mines et de l'Energie, Direction des Hydrocarbures

Direction Générale des Douanes

State Companies

Societe Nigerienne des Produits Petroliers (SONIDEP)

Private Sector Oil Product Distributors

Libya Oil Niger

TOTAL Niger

Fiduciaire Conseil et Audit (FCA) (they audit the oil cos)

Mali

Government of Mali

Ministere de l'Equipement et des Transports, Direction Nationale des Transports Terrestres, Maritimes et Fluviales (DNTTMF)

Office Nationale des Produits Pétroliers (ONAP)

Private Sector Oil Product Distributors & Road Transport

SANKÉ Storage, Service Stations and Transport

SHELL Mali

TOTAL Mali

TRANSRAIL *(Dakar-Bamako railway concessionaire*)

Sénégal

Government of Sénégal

Ministère de l'Energie, Direction de l'Energie

Comité Nationale des Hydrocarbures

State Companies

Société Africaine de Raffinage (SAR)

Private Sector Oil Product Importers & Distributors

TOTAL et Groupement Professionnel de l'Industrie du Pétrole (GPP)

ADDAX/Oryx Groupe et Association Sénégalaise des Produits Pétroliers (ASPP)

Alanau Petroleum International (API)

Uganda

Government of Uganda

Ministry of Energy and Mineral Development,

State Companies -- none

Private Sector Oil Products Distributors

Engen

Chevron

Transporters and Others

Rift Valley Railways

Kenya

Government of Kenya

Energy Regulatory Commission,

Ministry of Energy

State Companies

National Oil Corporation of Kenya

Private Sector Oil Products Distributors

Petroleum Institute of East Africa

Transporters and Others

PrimeFuels (Kenya) Ltd

Kenya Airways.

Tanzania

Government of Tanzania

Energy and Water Regulatory Authority

State Companies -- none

Private Sector Oil Products Distributors

Addax & Oryx Group

Oryx Oil Company Ltd.

GAPCO/GAPOIL Tanzania Ltd

Transporters and Others

World Bank Resident Mission

Malawi Cargo Center Ltd

TAZARA Railroad

Malawi (*Note: no field visit to Malawi; all contacts were by telephone and e-mails)*

Botswana (*Note: no field visit to Botswana; all contacts were by telephone and e-mails)*

South Africa

Government of South Africa

National Energy Regulator of South Africa

Dept. of Minerals and Energy,

State Companies -- none

Private Sector Oil Products Distributors

Total South Africa (Pty) Ltd

South African Petroleum Industry Assoc.

BP South Africa (Pty) Ltd.

Transporters and Others

Unitrans Fuel and Chemical (Pty) Ltd

Madagascar

Government of Madagascar

Office Malgache des Hydrocarbures

State Companies -- none

Private Sector Oil Products Distributors

Total Madagasikara

Madagascar Energie Internationale Ltd.

Transporters and Others

Madarail.

JIRAMA

Internet Links

Botswana

http://www.gov.bw/	Official site of the government of Botswana

Burkina Faso

http://www.sonabhy.bf/#	Official SONABHY Site
http://www.primature.gov.bf/sites_web_ministeriels/sites_web.php	Official Site of the Prime Minister of Burkina Faso
http://www.sidwaya.bf/	SIDWAYA – local online news publication

Côte d'Ivoire

http://www.sir.ci/	Official SIR site
http://www.ipetrolenews.info/entretien.php?id=52	Local petroleum news site
http://www.petroci.ci/presentation.html	Official PETROCI site

Kenya

http://www.erc.go.ke/	Official site of Kenya's Energy
http://www.energy.go.ke/	Regulatory Commission Official site of Kenya's Ministry of Energy.
http://www.kpc.go.ke/	Official site of the Kenya Pipeline Co.

Madagascar

http://www.omh.mg	Official site of the Office malgache des hydrocarbures
http://www.moov.mg	Business and economic news including Madagascar's oil sector
http://www.jirama.mg	Official site of the private national electricity and water co.

Malawi

http://www.malawi.gov.mw	Official Malawi government site, includin the Malawi Energy Regulatory Authority
http://www.dailytimes.bppmw.com	Local news on Malawi

Mali

http://www.onapmali.com/	Official ONAP site
http://www.afribone.com/	Online site of Malian news publication
http://www.malikounda.com/	Online site of Malian news publication

Niger

http://www.sonidep.com/	Official SONIDEP site
http://www.liberation-niger.com/	Online site of weekly Nigerien publication "Liberation Niger

Senegal

http://www.energie.gouv.sn/index.php	Official Ministry of Energy site
http://www.sie-energie.gouv.sn/spip.php?article8	Energy Information System site

South Africa

http://www.dme.gov.za	Official Ministry of Energy site
http://www.nersa.org.za	Official site of the National Energy Regulator of South Africa (only pipelines of relevance for this study)
http://www.cef.org.za	Site of the government's holding company for all state-owned energy companies, including ports, pipelines and railways
http://www.sapia.co.za	Site of the South African Petroleum Industry Assoc.

Tanzania

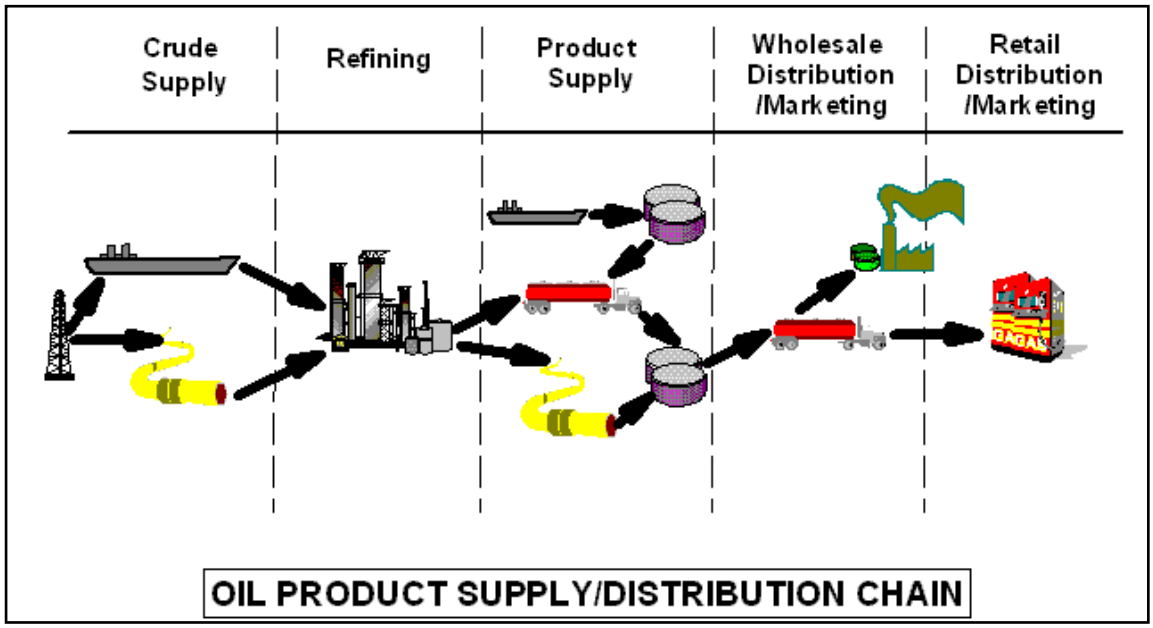
http://www.ewura.go.tz	Official site of the Energy and Water Utilities Regulatory Authority

Uganda

http://www.myuganda.co.ug	Government of Uganda information site

Annex 2 Generic Downstream Petroleum Supply Chain

The following schematic provides a simplified overview of a typical generic downstream petroleum supply chain. The segments of the supply/distribution chain are as follows:



1. Crude Supply

This activity involves the acquisition of crude oil and its transportation to a refining facility. It entails a crude oil selection process including consideration of qualities, finished product yields in refining, price, location and procurement terms in comparison with other crude oil supply options. Its transportation/logistics from producing wellhead to the refinery may involve several transport modes and intermediate storage steps. The two most common transport modes to the refinery are by marine tanker and pipeline but road tankers, rail and barges may also be employed in special circumstances.

2. Refining

Since crude oil has limited usefulness as an end product, it must be processed into finished products such as LPG, gasoline, jet/kerosene, gasoil/diesel and heavy fuel oil in specialized refining facilities. Such plants are generally large-scale, located in close proximity to major markets with complex processing facilities adapted to these market requirements.

3. Product Supply

This activity involves the acquisition from refining sources of the supply and quality of product appropriate to markets being served and its transportation to storage facilities close to these final markets. It entails a procurement and transport/logistics coordination process including considerations of volumes required, procurement modality, price, sourcing/location, contracting terms and supply dependability. Transport modes from primary sources such as refining to secondary storage include marine tanker, pipeline, road tanker, rail and barge. This is often termed the “bulk transport” segment of the supply/distribution chain.

a. Wholesale Distribution/Marketing

The distribution/marketing segment whether retail or wholesale is the last link of the supply/distribution chain. The wholesale distributor is generally synonymous with "oil marketing company" (OMC). The OMC activity involves the acquisition from the bulk supply link of finished products in the volume and quality appropriate to the OMC's market. Products are delivered by road tanker to bulk consumers ("consumer sales") such as power generation, industry, large commercial customers and transport fleet clients as well as to the OMC's affiliated (branded) retail service station network. Occasionally the OMC may also be delivering to independent retailers under supply contract sales arrangements. The OMC is largely an administrator and/or manager of distribution activities without necessarily owning a huge stake in the assets involved in these activities. For example it is quite common to outsource most of the road transport activities to independent owner-operators. In addition, the OMC may be transiting storage depots owned by others under throughput fee arrangements.

An oil marketing company (OMC) is one which:

Sells oil products wholesale ***and which coordinates or carries out*** *at least one more of the following functions:*

- *Supply of oil products;*
- *Their storage and handling;*
- *Their transport:*
  - *To other terminals/depots;*
  - *To end-users;*
- *Retail marketing.*

50 years ago virtually all oil companies in SSA

b. Retail Distribution/Marketing

This refers to sales of automotive fuels, gasoline and gasoil/diesel through service station outlets. Kerosene and LPG as well as lubricants, parts and accessories may also be sold through these outlets. There has also been a trend towards mini-marts associated with these outlets, selling a range of groceries, snacks, fast foods and a miscellaneous corner store range of goods. The OMC's generally have a branded service station network. Depending on the arrangements with dealers, they have varying degrees of ownership of the assets of this network.

The degree to which OMC's own and operate assets as opposed to simply coordinating and administering a largely outsourced sector varies by company philosophy and strategy and also in accordance with the maturity of their involvement in the particular country. In a "green-field" startup situation it is common to see an OMC start out with largely self-owned and operated facilities such as trucking and service stations. As the

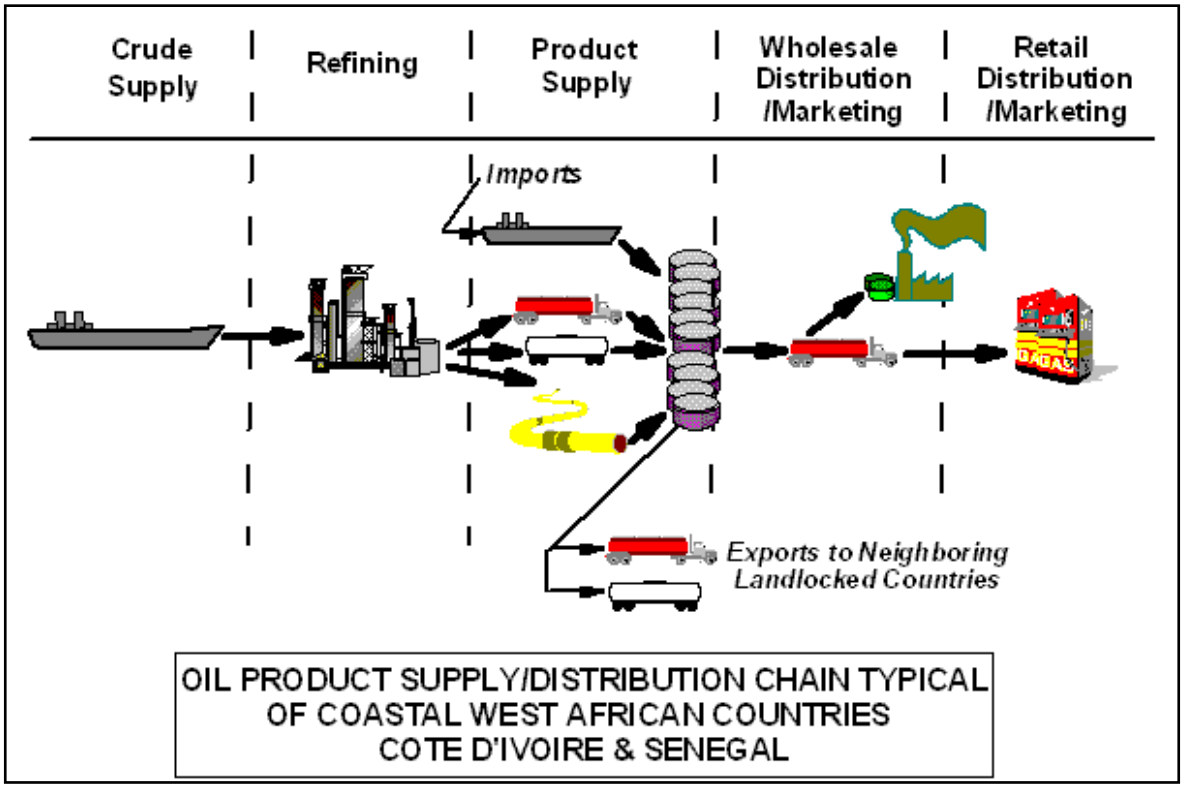
business matures the OMC looks for private independent operators, even helping to train and finance them so that the OMC can contract out progressively more of these activities, akin to franchising.

c. Aspects Specific to Sub-Saharan Africa Downstream Petroleum Sectors

The five West African countries considered in this study may be subdivided into two distinct groups as characterized by their downstream petroleum sectors:

1. The coastal countries, Côte d'Ivoire and Senegal
2. The landlocked countries, Burkina Faso, Mali and Niger

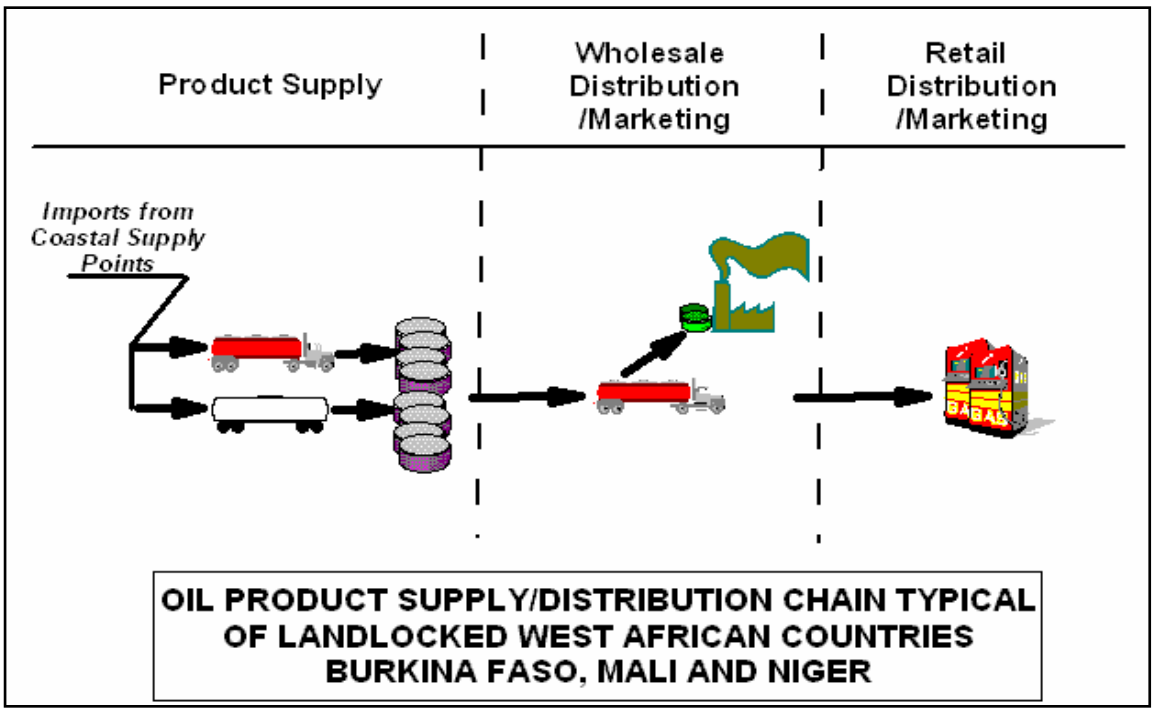
The following schematic illustrates the typical configuration of the supply chain in the coastal countries. The principal supply comes from the local refinery derived from imported crude oil. There are also significant imports of finished products in addition to the refinery supply. In addition to supplying domestic wholesalers via road, rail and pipeline connections to secondary depots, there are exports from the secondary depots to the landlocked countries via road and rail.



OIL PRODUCT SUPPLY/DISTRIBUTION CHAIN TYPICAL OF COASTAL WEST AFRICAN COUNTRIES COTE D'IVOIRE & SENEGAL

The third schematic below illustrates the typical supply/distribution chain of the landlocked Sahelian countries. Bulk product supply is via imports through the coastal transit countries such as Côte d'Ivoire and Senegal although Benin, Togo and Ghana are very much in the picture as coastal supply points to these countries as well. The transport modes are road and rail. The supply lines are long – ranging from 900 to 1300 km. The road and rail shipments are delivered to land-based depots near the main population centers. In two of the countries, Burkina Faso and Niger, the bulk product supply function and land based depot management is a state monopoly. From the main land depots product is lifted by road tanker by the local OMCs and delivered to their large consumers and to their retail service station networks.

OMCs in the E&SA countries range from small local independent oil companies through to large multinationals. They may also belong, in whole or in part, to their respective states, such as with PetroSA in South Africa or the National Oil Corporation of Kenya (NOCK). Typically in SSA, OMCs are not vertically integrated and rely on third-party operators and dealers to carry out various functions in the delivery chain, especially storage and handling, transport and retailing. Operators, on the other hand, often are only involved in one specific activity and do not co-ordinate oil product movements.



OIL PRODUCT SUPPLY/DISTRIBUTION CHAIN TYPICAL OF LANDLOCKED WEST AFRICAN COUNTRIES BURKINA FASO, MALI AND NIGER

d. Procurement of Crude Oil and Finished Products

3.1 Overview of World Petroleum Markets

Crude

At present the world crude oil market broadly consists of two segments: (i) Marker Crudes - such as Brent, West Texas Intermediate (WTI) and Dubai - Spot, Forward and Futures Markets, and, (ii) Large physical market for exports from OPEC and developing countries, so-called 'producing countries market'

Marker Crudes

Brent: The North Sea Brent market began in the early 1980's, as production developed from this area, largely as a means of selling the crude oil in advance of its production in order to avoid the risk of falling oil prices.[2] Although trade was originally limited to only actual 'wet' barrels, the market soon expanded to cover a number of paper deals which were struck based on speculating

[2] The UK Oil Tax regime also created major incentives for developing a market for North Sea crudes.

future prices, and were generally closed before delivery. The main[3] Brent Market is not a formal, regulated futures market, but is a 'forward market' which could be called a trading club; there are a limited number of participants (generally industry professionals) who know each other. Brent is generally considered to be at the heart of international crude oil price formation.

WTI on NYMEX: WTI has become an important international marker crude. In 1983 the New York Mercantile Exchange (NYMEX) introduced a crude oil futures contract for 1,000 barrels of WTI (40^o API, 0.4% sulphur) crude available at Cushing Storage, Oklahoma. Its equivalent in some 10 other domestic or import grades of light, sweet crude are all acceptable for delivery with appropriate premiums or discounts. In spite of there being certain imperfections in the trading/price relationship between a US local, small-volume, landlocked crude like WTI[4] and a large-volume, internationally-traded, tidewater crude like Brent, WTI prices generally move in harmony with those of Brent. The average price differential (taken over 1 or 2 months period minimum) between the two crudes roughly reflects the cost of ocean freight to ship Brent from the North Sea to the US Gulf Coast (USGC).

Dubai - Fateh: Dubai Fateh crude is a medium sour grade (31^o API, 2.0% sulphur, with a relatively stable production base of about 300 thousand bpd; it is produced by several equity producers in a non-OPEC country and has a quality similar to Arab Light. The Dubai market is an informal forward market, similar to the Brent forward market, but with smaller volumes and shorter term of forward selling (one or two months ahead compared with Brent=s four to six months). Although once dubbed the "Brent of the East," its value now bears little correlation to Eastern oil markets and is now largely determined by incremental disposition in the Atlantic Basin and attendant freight and quality differential factors versus Brent.

Producing Countries Market

The producing-countries market covers the bulk of physical crude oil movements in international trade. It involves an interface between the oil-exporting countries or their national oil companies on the selling side, and oil companies or commodity traders from the rest of the world on the buying side. The oil is generally sold under arm=s length transactions within commercial contract arrangements and priced through formulae which relate to one or more of the freely-traded marker crudes.

Although at first glance this largest segment of the market appears rather passive in taking marker prices as they emerge and using them in their pricing formulae, in fact there are some more complex interactions:

(a) the producing countries regularly adjust their formulae coefficients to change the relationship with the marker crude(s), depending on their perception of market conditions, relative value of quality, changes in ocean freight rates ..etc.

and

(b) certain producers such as Saudi Arabia alone or OPEC in concert, are in a position to influence world oil supplies, hence market prices;

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[3] In 1988 the International Petroleum Exchange (IPE) created a regulated futures market for Brent, which has grown in importance relative to the forward market, but is still only a bit more than half the volume of forward trading.

[4] Due to pipeline logistics, crude availability from the fields and other local US trading problems.

Summary - World Crude Markets

The world crude market consists of two parts which interact in specific ways. The large producing-countries market that takes the prices that emerge in the marker crudes market has some influence on their formation. The first linkage (the price taking) between the two sets is strong, the second (the producing countries= influence) is generally weak, always dependent on perceptions and only manifesting itself in certain circumstances. Relative prices of the key marker crudes find their equilibrium in the Atlantic Basin. Since the early 1970s several factors have combined to make the world petroleum market much more open, transparent and efficient: (i) massive decline in proportion of oil moving within integrated oil company channels, (ii) decline in power of OPEC, and, (iii) advent of freely-traded crudes, with their attendant Spot , Forward and Futures market instruments.

A 1997 study[5] concluded that the world oil market is unified and that prices for the same quality crude oils from different parts of the world, adjusted for ocean freight to the main clearing market, do not deviate from each other, practically eliminating arbitrage opportunities in global crude trading.

Products

There are five major world markets for the trading of finished oil products: Rotterdam, Mediterranean, New York Harbour, US Gulf Coast and Singapore; in addition there are important, but not fully-developed markets, in the Caribbean and Arab Gulf. The map, Figure 2.1, illustrates the location of these markets.

Rotterdam

The Rotterdam market is almost synonymous with spot trading. It was the birthplace of petroleum spot trading because of its extensive refining, storage and transport/distribution facilities in the Antwerp-Rotterdam-Antwerp (ARA) area. Its importance as a market has been reinforced in recent years because of the production and trading of nearby North Sea crude. Not only has Rotterdam always been the most active spot market but it is the only market which both imports and and exports large quantities of spot crude and products. Like the forward market for Brent it has no centralized exchange and trade is carried out by telephone and other electronic means.

Mediterranean

There is a second important European product market focused on the extensive refining and product supply in and around the Western Mediterranean, primarily Genoa in Italy and Lavera in France. It has a very significant role in the product pricing and procurement contract arrangements throughout North and West Africa.

New York Harbour (NYH)

This market is based on the enormous petroleum product consuming region of the US North East which is deficit in both crude oil and refining capacity and hence is a major imported product region. The trading here is on the spot market but is also tied in with the large NYMEX futures market in gasoline and m 2 Heating Oil contracts.

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[5] Gülen, S. Gürcan ARegionalization in the World Crude Oil Market@ (1997) *The Energy Journal* 18(2): 109-126.

US Gulf Coast (USGC)

The USA is by far the largest market for crude oil and finished products in the world. Much of this petroleum trade is focused around the largest concentration of refining in the world, some 7 million barrels per day of capacity[6], located in the Gulf Coast area - mostly in Texas and Louisiana. Apart from supplying a bit less than half of this refining output to its immediate tributary market in the Gulf Coast, it supplies the major portion of the US North East deficit product, and some to the mid- Continent/Chicago area: gasoline and m 2 oil by pipeline and fuel oil by barge and tanker. It is also a significant exporter of finished products to Mexico, the Caribbean and Central America. Due to its fixed pipeline linkages and enormous trading volumes with the US Northeast, the US Gulf Coast spot product market is closely tied to prices in the NYH spot and New York Mercantile Exchange (NYMEX) futures market.

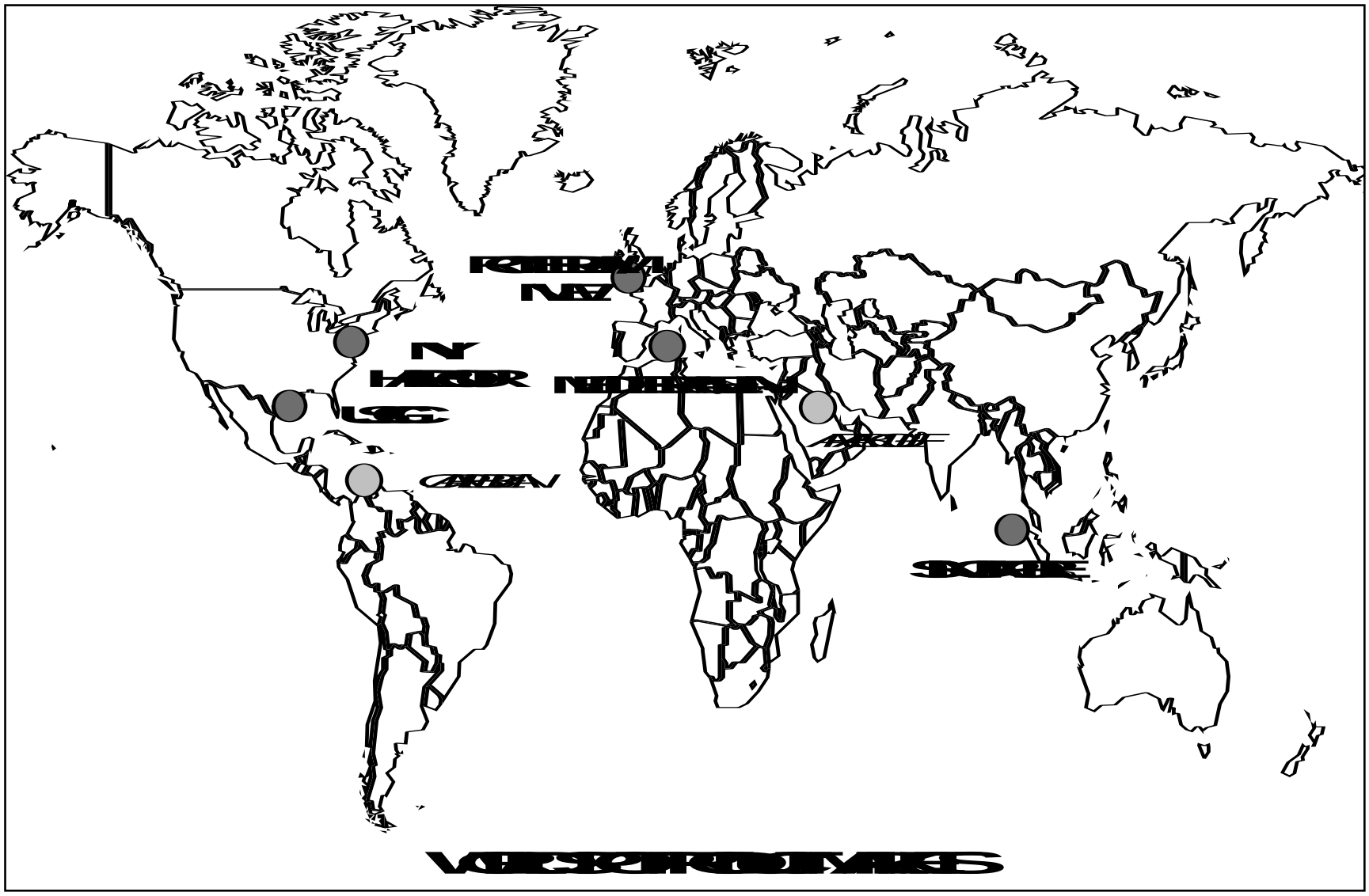
Singapore

Singapore=s strategic location at the crossroads of Asia, its free market economy and important refining and product storage capacity has resulted in it evolving into one of the major spot product markets. It also has a forward market in gasoil and a small futures market on the Singapore Monetary Exchange (SIMEX) in crude and fuel oil.

Smaller Markets

There are growing spot markets in the Arab Gulf and the Caribbean but the trading is rather thin at present and the prices quoted in the Price Assessment Services (e.g. Platt's, Petroleum Argus) are usually based on netbacks from one of the major markets discussed above, since there are not always daily transactions.

[6] Also the most complex capacity configuration in the world, with significant coking capacity in addition to cracking and other secondary processing units.



Characteristics of Petroleum Trading Practices

Crude oil and products are traded in either of two categories: by contract (often referred to as term arrangements) or by spot transactions. A contract sale commits the buyer and seller to trade oil over a set period of time at predetermined conditions for price and all other important commercial parameters. In the past, prior to the mid- 70's, such predetermined conditions were usually very fixed and inflexible, perhaps for as much as three years at one, fixed price of sale. More recently such fixed deals are unheard of, and the price and other commercial parameters of term arrangements are flexible, related to market conditions at the time of acquisition. Spot sales on the other hand, refer to very short-term, day-to-day trading, generally involving one cargo of oil per deal, with each deal struck at an agreed price for prompt lifting or delivery.

Stages of Development of Petroleum Spot Markets

Spot oil transactions have existed as long as the existence of the industry itself, but today we generally think of the trading which occurs in the five main product markets summarized above. These markets are now firmly established, evolving through four distinct stages over the past three decades:

1. Residual Market: In the early days, prior to the 70's, the main function of the spot market was to balance the major oil companies= surpluses and deficits in their refining and product supply systems. Most of the oil at that time flowed in the majors= channels from wellhead through refining to final consumer. The spot trade was, therefore, a relatively small residual channel of oil trade, accounting for about 5% of total trade. The remaining 95% was based on contracts specifying quantities and prices over fairly long periods of time. The spot trade had very little effect on, or relationship to, the contract trade at this early period; spot prices were set in relation to contract prices - at a premium to contract prices in tight markets at a discount in soft markets.

2. Marginal Market: After the 1973-74 crisis the spot market began to play a marginal role in petroleum trading. The distinction with the residual market is that spot prices began to become an indicator of market conditions and started to have an effect on contract prices. This evidenced itself in 1975-78 when low spot prices were used as indicators by the industry and producers of soft market conditions, and conversely of tight conditions in 1979. Spot and spot-related trade during this period, though a significant player in the market, was still smaller than contract trade.

3. Major Market: It was after 1983 that spot and spot-related trade started to grow appreciably and by 1985 these two categories are estimated to have accounted for about 85% of internationally traded oil. The excess of supply and particularly of refining capacity during this period was a major contributor to the establishment spot and spot-related business as the dominant mechanism. In order to survive, refiners were forced to buy crude in the spot market and refine for the spot product market, as long as they were covering variable operating costs. The OPEC producers contributed to the growth of this mechanism, as well as they resorted to all sorts of spot-related deals involving netbacks pricing, barter trade etc. in order to maintain or recapture sales volumes.

4. Parallel With Futures Markets: The development of the futures markets in oil was in part a reaction to the enormous growth in the spot market as a means of moderating the inherent instability and uncertainty of such a market. The first successful futures contract was the NYMEX heating oil (No.2) in 1978 followed by light sweet crude (WTI equivalent) in 1983. There are now NYMEX contracts for regular gasoline as well as propane and natural gas. As has been the case in the development of other commodity markets, the coexistence of spot and futures trading is a sign of a maturing market.

Spot-Related Transactions

As mentioned above, usual contract/term arrangements at present for the sale/purchase of several product cargoes over a period of time are generally structured such that the selling price, freight and other commercial parameters are related to market conditions at the time of acquisition. Although spot-related they are generally dependable term supply arrangements bearing little of the distress nature of emergency, last-minute spot purchasing.

Sources of Market Information

One of the essential elements in the promotion and maintenance of an efficient, competitive market is information on the market itself. In petroleum trading much of this information flow occurs through informal contacts among the professional players themselves but is reinforced by the existence of several market assessment services. The best known and most widely used service is Platts -Standard and Poor's, one of the McGraw Hill group of companies. Other reliable assessment services are Petroleum Argus, Bloomberg Energy/Oil Buyer's Guide and Petroleum Intelligence Weekly. The level of transaction prices in the key World/regional Spot product markets, such as Rotterdam/Northwest Europe, Mediterranean, US Gulf Coast, NewYork Harbour, Arab Gulf and Singapore are assessed on a daily and/or weekly basis by these price assessment services. They also have other key oil supply cost information such as assessments of the market freight rates for oil tankers.

All of these price assessments are based on a sounding of the spot market players on a regular, daily or weekly, basis. They are not like futures prices which are established in a formal trading floor and are transparent and objective. These spot assessments may have some subjectivity to their determination, but are widely accepted by many types of users as the spot price. Platts in fact is often synonymous with the spot price among many oil industry professionals. The spot prices as reported by these assessment services are used in a number of applications:

- Term, multi-cargo product supply contracts with pricing clause related to spot price at time of loading
- Government wholesale and/or retail price controls
- Government wholesale and retail price analysis and monitoring
- Analysis by oil companies relevant to decisions as to refining to supply internal product needs versus purchasing on the spot market

3.2 Procurement Practices

Crude Oil

There are a number of procurement modalities for acquiring crude oil:

State-to-State Arrangements

State-to-state deals typically represent some 5 to 10% of world market trading volume but represent a higher percentage in the developing world. For example most of the crude acquired by the two West African refineries, SAR, Dakar and SIR, Abidjan is procured through state-to-state arrangements with Nigeria. An arrangement like this generally includes a volumetric allocation of crude in multi cargoes of a certain grade valid for a certain term, e.g. 12 months. The pre-agreed price is linked to the price of the pertinent marker crude at time of loading, e.g. Brent through a formula.

International Competitive Bidding (ICB)

Occasionally a refinery may organize a call for tenders for the multi-cargo term supply of a certain volume and quality (grade) of crude oil. This is less common with crude oil than with finished products, however, since refineries usually require specialized crude diets and crude price formulae are fairly transparent with not a great deal of leeway for traders to compete.

Open Tendering System (OTS)

An OTS is usually applied to a situation where there is a mixed capital refining company with government-multinational oil company ownership providing the bulk of oil products to the country. In order to level the playing field on crude supply, the opportunity to supply crude oil to the refinery is granted to all OMCs who participate in the country's oil products market and not just to the OMCs who are refinery owners. The government generally coordinates and adjudicates the functioning of an OTS within a committee comprised of government, refinery and OMC representatives. Each OMC's monthly crude processing requirement is computed in accordance with a formula set by the refinery. Tenders are then invited from all the OMCs to bid for the total supply requirement. The company with the lowest bid automatically wins the tender. The winner will import the crude and have it discharged into refinery receiving tankage. Title to the crude is then transferred after the buyer has prepaid the tender price to the Importer.

Negotiated Term Arrangements

An arrangement may be made through negotiations with one or more international oil traders for one of these traders to supply crude oil of a certain volume and quality in multi-cargoes over a certain term.

Spot Purchases

Often the above term arrangements are designed to supply the bulk of estimated requirements for a given term and then are "topped up" through last minute purchases in the Spot market. It is in the interest of the refinery to minimize such purchases since the price and freight terms are usually more onerous than pre-arranged multi-cargo term arrangements.

Finished Products

As with crude oil there are a number of procurement modalities for acquiring finished products:

International Competitive Bidding (ICB)

Where there are state owned/operated bulk supply and storage companies, they often acquire a major portion of their finished product supplies through an ICB process. Typically they would issue a widely-disseminated call for tenders on the supply of a quantity of products to be supplied in several 25 000 to 35 000 tonne combined cargoes, delivered (CIF) to a given port terminal over a period of 6 to 12 months. The key competitive element in the bid is the discount or premium over the pertinent Spot market marker for the given product.

Open Tendering System (OTS)

In a situation where there is a partially or wholly owned state refining company which the government wishes to protect from unfettered competition from finished products supplied from international markets, the deficit product which the refinery is unable to supply is imported under a system which allocates the right to import to the OMCs operating in the country. The OMCs with their internationally affiliated traders/agents each have the right to bid on a regularly declared deficit amount. This deficit amount is derived by the refinery and the whole process is under the administrative oversight of the government within a committee comprised of representatives of the refinery, government and all the licensed OMCs.

Negotiated Term Arrangements (Long Term Supply Contracts)

It is common for both state supply companies within a monopoly situation and individual OMCs in a liberalized supply environment to acquire products from reliable traders or regional oil refining companies under negotiated term arrangements. In the case of regional refining companies it is common to have a species of "posted prices" established for a given neighboring country. The prices are established in terms of a premium over the pertinent Spot market price at date of lifting.

Spot Purchases

Because of miscalculations or unforeseen problems with the base load term arrangements there is usually always a need for last minute supplies acquired one a one-off cargo basis through traders from the Spot market. These usually command a higher premium, delivered CIF, over Spot market price due to higher margins over the spot market at source and higher ocean freight charges for last minute arrangements.

3.3 Lag Time in the Oil Product Supply Chain and Implications for Pricing

The actual physical lag time in product supply chains will vary in accordance with complexity of the chain.

In a crude oil/refining chain, the typical lag time between acquisition of raw material at source and dispensing of final product at the pump will vary between 30 and 75 days, depending on complexity and extension of the supply system. In a marine supply configuration this total lag time covers tanker loading at source, tanker voyage, crude inventory turnover time at refinery, processing time, product inventory turnover time at refinery and the local transport and inventory turnover time between refinery and dispensing at the pump.

In a finished product marine supply chain the physical lag time between tanker loading at source and dispensing final product at the pump will be shorter, in the 15 to 60 day range, depending on the configuration of the system.

Price-Controlled Environments

Most product price control systems have monthly price adjustments based on changes in monthly average spot product prices and marine freight. The price for current month "0" is established by applying the difference in average costs between month -1 and -2. This implies that there is an average 1 month lag time in prices built into such systems.

Liberalized, Market-Determined Price Environments

In principle, the oil product prices in an open market environment are determined by market competition and not by underlying costs. In practice, the raw material costs are major determinants in the OMC players' price adjustment strategies. To the extent that these raw material cost changes come into play, the actual physical system lag times discussed above usually have little bearing on the timing of adjustments. To the extent that market competition allows, the OMCs will try to recover their increases in costs at source through price increases at the pump. Conversely, in a decreasing cost environment, market competition will generally result in fairly immediate price reductions at the pump.

Inventory Valuation Accounting Conventions

To the extent that accounting conventions bear on pricing strategy in the oil business, it would seem that the Last-in, First out (LIFO) method is being applied.

There are three basis approaches to valuing inventory that are allowed by U.S. generally accepted accounting principles (GAAP) -

(a) First-in, First-out (FIFO): Under FIFO, the cost of goods sold is based upon the cost of material bought earliest in the period, while the cost of inventory is based upon the cost of material bought later in the year. This results in inventory being valued close to current replacement cost. During periods of inflation, the use of FIFO will result in the lowest estimate of cost of goods sold among the three approaches, and the highest net income.

(b) Last-in, First-out (LIFO): Under LIFO, the cost of goods sold is based upon the cost of material bought towards the end of the period, resulting in costs that closely approximate current costs. The inventory, however, is valued on the basis of the cost of materials bought earlier in the year. During periods of inflation, the use of LIFO will result in the highest estimate of cost of goods sold among the three approaches, and the lowest net income.

(c) Weighted Average: Under the weighted average approach, both inventory and the cost of goods sold are based upon the average cost of all units bought during the period. When inventory turns over rapidly this approach will more closely resemble FIFO than LIFO

Although LIFO is indeed the most common inventory valuation convention adopted by the oil industry, it should be emphasized that this is an accounting/finance convention and pricing and price adjustment strategy are not necessarily heavily influenced by this.

Annex 3 Selected Product Specifications

- Burkina Faso
- Côte D'Ivoire
- Kenya
- Madagascar
- Mali
- Niger
- Senegal
- Tanzania
- Uganda

Country	Source of Specifications Which Follow
Burkina Faso	SONABHY, official specifications of the company
Côte D'Ivoire	SIR, from interview
Kenya	Consultant reported same as Tanzania
Madagascar	OMH arrêtés numbered 22440 to 24541/2004/MEM and arrêté number 155/2006/MEM/OMH.
Mali	Arreté(s) Interministériels 90-1563,1564,1565 of the 19th May, 1990
Niger	SONIDEP, from interview
Senegal	Decree 2003-415, June 4, 2003, modified by unofficial, unformalized change in July 2005 to gasoline octane and lead content; no Decree has been issued
Tanzania	Tanzanian Bureau of Standards: TZS 672: 2006(E) for gasoline; TZS 580:2006(E) for illuminating kerosene and TZS 674:2006(E) for automotive gasoil.
Uganda	Consultant reported same as Tanzania

Gasoline

Property	Burkina Faso	Côte D'Ivoire	Kenya	Madagascar		Mali	Niger	Senegal		Tanzania	Uganda
				Regula	Premiu			Regul	Premiu		
Research Octane Number	91	91	93	87	91	91 *	91	87	91	93	93
Lead content g/l Max	0.013	0.013	0.013	0.30	0.013	0.013 *	0.013	0.013	0.013	0.013	0.013
Distillation											
- 10% evaporated at °C	75	n.a.	n.a.	n.a.	n.a.	70	n.a.	75	75	n.a.	n.a.
- 50% evaporated at °C	n/a	n.a.	n.a.	n.a.	n.a.	125	n.a.	125	125	n.a.	n.a.
- 90% evaporated at °C	n/a	n.a.	n.a.	n.a.	n.a.	180	n.a.	180	180	n.a.	n.a.
Final Boiling Point °C	215	n.a.	n.a.	n.a.	n.a.	210	n.a.	210	210	n.a.	n.a.
Residue %volume Max	2	n.a.	n.a.	n.a.	n.a.	2	n.a.	2	2	n.a.	n.a.
Density at 15°C kg/1	0.720	n.a.	n.a.	n.a.	n.a.		n.a.	0.715	0.715	n.a.	n.a.
Max	0.790	n.a.	n.a.	n.a.	n.a.	0.770	n.a.	0.770	0.770	n.a.	n.a.
Vapor Pressure at 37.8°C	650	n.a.	n.a.	n.a.	n.a.	635	n.a.	630	630	n.a.	n.a.
Induction Period, minutes	240	n.a.	n.a.	n.a.	n.a.	240	n.a.	240	240	n.a.	n.a.
Gum Existent	5	n.a.	n.a.	n.a.	n.a.	4	n.a.	3	3	n.a.	n.a.
Sulfur Content % weight	0.05	n.a.	n.a.	n.a.	n.a.	0.2	n.a.	0.15	0.15	n.a.	n.a.
Copper Strip Corrosion	1b	n.a.	n.a.	n.a.	n.a.	1	n.a.	1	1	n.a.	n.a.

* Shown as 95 RON and 0.4 g/l sulfur in detailed spec for Mali which follows but obviously not updated as they are definitely importing unleaded 91.

Kerosene

Property	Burkina Faso	Kenya	Madagascar	Mali	Senegal	Tanzania	Uganda
Densitv 15°C kg/l Max	0.830	n.a.	n.a.	0.820	0.820	n.a.	n.a.
Smoke point mm Min	22	20	19	21	21	20	20
Distillation							
% evaporated at 200°C Min	20	n.a.	n.a.	20	20	n.a.	n.a.
Final Boiling Point °C	300	n.a.	n.a.	300	300	n.a.	n.a.
Flash Point °C Min	38	n.a.	n.a.	37.8	38	n.a.	n.a.
Sulfur content % weight Max	0.15	0.20	0.20	0.15	0.15	0.20	0.20
Copper strip corrosion Max	1b	n.a.	n.a.	1b	n° l	n.a.	n.a.

Gasoil

Property	Burkina Faso	Côte d'Ivoire	Kenya	Madagascar	Mali	Niger	Senegal	Tanzania	Uganda
Density at15°C kg/1 Min	0.820	n.a.	n.a.	n.a.	0.820	n.a.	0.820	n.a.	n.a.
Max	0.890	n.a.	n.a.	n.a.	0.880	n.a.	0.880	n.a.	n.a.
Color Max	5	n.a.	n.a.	n.a.	3	n.a.	3	n.a.	n.a.
Cetane number Min	45	45	48	48	45	45	45	48	48
Kinematic Viscosity at 37.8°C cst	1.6	n.a.	n.a.	n.a.	1.6	n.a.	1.6	n.a.	n.a.
Max	5.9	n.a.	n.a.	n.a.	5.9	n.a.	5.9	n.a.	n.a.
Sulfur content % weight Max	1.0	1.0	0.5	0.5	1.0	1.0	0.5	0.5	0.5
Cloud Point °C Max	+5	n.a.	n.a.	n.a.	n/a	n.a.	+7	n.a.	n.a.
Copper strip corrosion . Max	1b	n.a.	n.a.	n.a.	n/a	n.a.	1	n.a.	n.a.
Conradson carbon residue % wgt	0.15	n.a.	n.a.	n.a.	0.15	n.a.	0.15	n.a.	n.a.
Water content %. vol Max	0.05	n.a.	n.a.	n.a.	0.05	n.a.	0.05	n.a.	n.a.
Sediment % weight Max	0.01	n.a.	n.a.	n.a.	0.01	n.a.	0.01	n.a.	n.a.
Ash % weight Max	0.01	n.a.	n.a.	n.a.	0.01	n.a.	0.01	n.a.	n.a.
Flash point°C Min	61	n.a.	n.a.	n.a.	61	n.a.	61	n.a.	n.a.
90% Distilled °C Max	357	n.a.	n.a.	n.a.	360	n.a.	362	n.a.	n.a.

Annex 4 Burkina Faso

1. Legal, Regulatory, Institutional Framework – Sector Organization

1.1 Introduction

Two Ministries share the responsibility for oversight of the oil products sector in Burkina Faso:

- Ministry of Commerce, and Promotion of Business and Crafts, for operator licensing and pricing matters
- Minister of Mines, Quarries and Energy for technical matters relating to product quality and registry of infrastructure

Table A4.1 provides a summary of parameters[7] relating to the legal, regulatory and institutional organization of the sector.

Table A4.1: Burkina Faso Downstream Oil Sector Legal, Regulatory & Institutional Framework

Population, 2007, millions	14.8
GDP per capita, Atlas *(WB WDI 10 sep 08)*	$458
Percent of oil products imported	100%
Degree of socio-political freedom *(Freedom House 2009)*	Partly Free
Government Participation in:	
Refining	n/a
Importing Oil Products	100%
Logistics (Storage) Infrastructure	100%
Marketing Oil Products	None
Contingency/Strategic Stocks	Yes
Existence of Comprehensive, Modern Downstream Legislation; COMMENTS	NO; only few disparate texts relating to price, licensing and SONABHY attributions
Rating 1-10	2
Existence of centralized, specialized Downstream Regulatory Institution (s); COMMENTS	NO - Old French model- Commerce for licensing and price, Mines/ En in principle for technical issues, but not effective
Rating 1-10	2
Oversight and Enforcement	Weak

Three important characteristics dominate the sector in Burkina Faso:

1. The lack of a comprehensive legal framework;
2. No central, specialized regulatory institution
3. The domination of the sector by the monopoly state importing and storage company SONABHY.

To a certain extent it could be said that existence of 3, is causal to 1 and 2. In countries where there is strong monopoly control by a state company over major segments of the sector, the need for, or rationale for, developing a comprehensive downstream law and regulations and a strong institution to regulate and enforce is often weakened. It is left to the state company to regulate itself and often to serve in a regulatory role over the private segments of the sector.

1.2 Legal/Regulatory Framework

There is no comprehensive downstream petroleum law governing the sector.

The regulatory framework for the sector includes the following texts:

- Decree creating the State Oil Company, SONABHY: N°. 85-035/CNR/PRES/PRECO of the 9th October 1985

[7] WDI = World Development Indicators, a World Bank Data Base covering 209 countries.

- Administrative Order (Arrêté) establishing the modalities for the adjustment of petroleum product prices: n° 01-035/ MCPEA/SG/IGAE, 10th May, 2001.
- Decree governing regulation of the distribution of petroleum products: n° 2002-146/PRES/PM/ MCPEA/MCE, 3rd May, 2002
- Administrative Order (Arrêté) establishing the provisions and criteria for licensing of petroleum product distributors: n° 01-022/MCPEA/MCE, 1st April, 2003.

There are also references to other, rather dated texts relating to hazardous establishments and hazardous goods but that is all that exists.

An example of texts which may not be that old but which require review with a view to regional/international best practices, are the official product specifications received from SONABHY. Among other qualities it shows the gasoil sulfur content specification at maximum 1.0% and fuel oil at 3.0% sulfur maximum. These do not conform with acceptable standards, particularly the gasoil. Even though there is not much risk of finding product that high in sulfur on the West African coast, because of low sulfur crude oil precursors in local refining, the danger is in becoming a dumping ground for high sulfur material from outside the region.

1.3 Institutions Specific to the Hydrocarbons Sector

The Commerce Ministry has officials involved in some oversight of the sector as part of general surveillance of all commercial activities but no specialized division or service for hydrocarbons. There is a weights and measures function which, in principle, checks on the metering of oil products dispensing at the service stations

The Mines/Energy Ministry has a "Hydrocarbons Division" which appeared to be solely involved with information collection and compilation. There is no apparent regulatory/enforcement function regarding the technical, environmental and safety performance of the sector.

State Owned or Controlled Enterprises

SONABHY (Société Nationale Burkinabè d'Hydrocarbures)

SONABHY is a State Corporation with a legal monopoly over the importation and storage of petroleum products. It reports to the Ministry of Commerce on technical issues and Ministry of Finance on financial issues

The missions of SONABHY may be summarized as follows:

- importation and storage of liquid and gaseous hydrocarbons;
- transport, bottling (refers to LPG) and commercialization of these products ;
- construction of storage infrastructure with a view to guaranteeing Burkina Faso's energy security ;
- support to research into energy substitution as well as into the popularization of new energy consumption technologies;

AND,

- in general, all industrial, commercial, financial and transport-related operations which relate, directly or indirectly to the above

There has been talk of privatization (in press references 2006-2007) but nothing has happened. More recently a Solicitation for Expressions of Interest on a study of "Partial Privatization" of SONABHY was issued in August 2008. A response from interested consulting companies was requested by September 12, 2008. There is a privatization commission involved in the process.

Benchmarking analyses have been performed in the past on SONABHY's import procurement performance and it came through with good marks. Its performance as a manager of the storage depots and all its other mandated function would have to be analyzed.

Private Sector

Private Distributors

There are four "multinational" oil marketing/distributing companies which are local affiliates of international companies:

- LIBYA OIL
- SHELL
- TOTAL
- ORYX

In addition there are fifteen "independents" – Burkinabe - owned distributors:

- ACCESS
- ECODIS
- ECO-OIL
- ELIKAN
- EMGA
- OTAM
- PEFAN
- PETROFA
- PETRO-GULMU
- PETROLUB
- PLUF
- SGE
- SKI
- SOGEL-B
- STD EMGA

The retailers (dealers) are private, independent operators under contract to distributors who coordinate the supply to them and other relevant distribution activities.

Table A4.2: Burkino Faso Oil Products Distribution Market Shares, Jan-Sept 2008 Sales

ALL PRODUCTS, EXCLUDING DIRECT SALES FROM SONABHY TO ELECTRIC POWER UTILITY, SONABEL

Companies	m^3	Share	Cumulative Share	H-H Index
TOTAL BF	130,593	37.8%	37.8%	1,428
BURKINA & SHELL	56,805	16.4%	54.2%	270
PETROFA	35,169	10.2%	64.4%	104
STD	21,733	6.3%	70.7%	40
ORYX	22,128	6.4%	77.1%	41
ECODIS	18,839	5.5%	82.6%	30
LIBYA OIL	18,338	5.3%	87.9%	28
OTAM	8,469	2.5%	90.3%	6
SOGEL-B	8,249	2.4%	92.7%	6
PLUF	7,679	2.2%	94.9%	5
SGE	5,281	1.5%	96.5%	2
ECO-OIL	3,515	1.0%	97.5%	1
SKI	3,556	1.0%	98.5%	1
PETROLUB	2,281	0.7%	99.2%	0
ELIKAN	913	0.3%	99.4%	0
PETRO-GULMU	696	0.2%	99.6%	0
ACCESS	494	0.1%	99.8%	0
PEFAN	462	0.1%	99.9%	0
EMGA	326	0.1%	100.0%	0
TOTAL	**345,526**	**100.0%**		**1,963**

Table A4.2 is an estimate of the 2007 market shares for all oil products combined and the attendant measure of the structural degree of industry concentration, using cumulative market shares and Herfindahl - Hirschman Index (HHI) as criteria. As shown the market leader has 38% of the total while the top 4 have 71%. Combined with an HHI of 1963 this is indicative of a fairly concentrated market structure. It may be concluded that the Burkina market is of medium-high concentration with some potential for market domination by a combination of the players.

LPG Sector

Entities involved in various aspects of the LPG business in Burkina Faso are summarized as follows:

Supply

SONABHY is the monopoly supplier of LPG, importing by road tanker from neighboring countries into its depots at Bingo (Near Ouagadougou) and Bobo-Dioulasso.

Bottling

SONABHY also has a monopoly on bottling, with a plant in each of its two depots.

Distribution

There are three private distributors of LPG:

- Transport et de Distribution de Gaz (STD-SODIGAZ)
- Oryx-Burkina
- Pétro-gaz Services.

2. Supply, Procurement Arrangements and Infrastructure

2.1 Supply, Procurement Sources and Arrangements

There are two modalities for procurement of white oil products into land-locked Burkina Faso

1. International Competitive Bidding for 30 to 40 thousand tonne cargoes on a term, multi-cargo basis, through *Société Togolaise de Stockage de Lomé* (STSL) Depot Lomé, Togo and/or through *Oryx o*r *Société Nationale de Commercialisation de Produits Pétroliers (SONACOP)* depots in Cotonou, Benin. The competing bidders are generally the trading affiliates of the multinational oil companies or independent traders. The price offers are structured based on PLATT'S EUROPEAN MARKETSCAN (generally PLATT'S MED) plus a premium or minus a discount, expressed in US$ per metric tonne. There is a Commission appointed to preside at the bid openings, comprised of SONABHY staff and a representative of the Ministry of Commerce. The products are trucked from these coastal depots to the SONABHY depots in Burkina.

   Occasionally small lot procurements must be made from traders through these same coastal depots under more short-term, "distress" conditions in order to meet an unexpected supply shortfall. These are made on a "consultation restreinte", restricted bidding, basis

2. Long-term Supply Contracts with SIR, Abidjan, with trader ADDAX through Oryx depot Cotonou or with trader TRIGON through Tema refinery Ghana. In the case of the SIR/Abidjan supply the products are loaded into road tankers or rail wagons in the GESTOCI depot, Vridi and trucked or rail transported via *SITARAIL* to the SONABHY depots in Burkina. In the case of ADDAX from Oryx, Cotonou and TRIGON/Tema the movements are all by road tanker. Generally the supply contract defines the annual minimum volumes of product in addition to a formula for the transaction price and the payment terms.

For LPG it is all procured by Direct Purchases from SIR, Abidjan or from the Tema Refinery Ghana, with the transport movement by road tanker.

Table A4.3 shows a breakdown of the supply

sources and modalities for year 2007.

Figure A4.1 provides a schematic map of supply sources and transport modes.

Table A4.3: Burkina Faso Oil Product Supply Sources & Arrangements, 2007 (%)			
Long-Term Contracts			ICB
ADDAX Cotonou	TRIGON Tema	SIR Abidjan	Via STSL Lomé
36	9	37	18

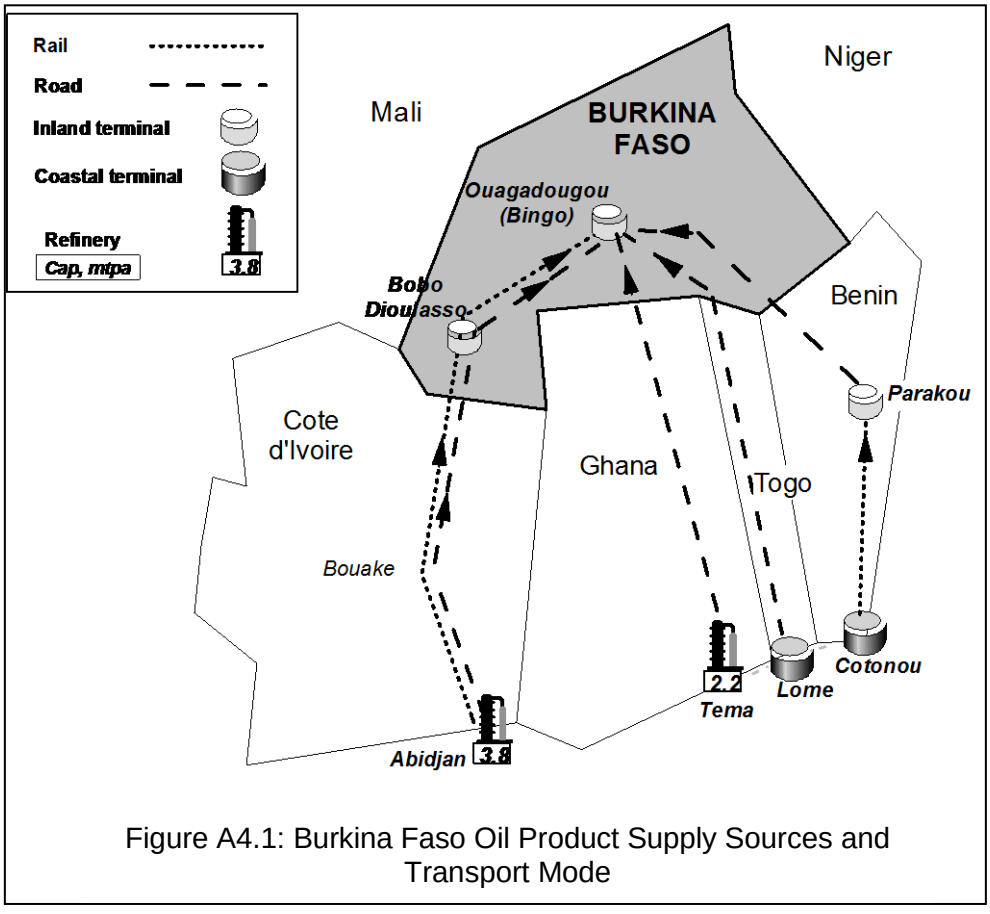


Figure A4.1: Burkina Faso Oil Product Supply Sources and Transport Mode

2.2. Infrastructure

Burkina has of Fleet of about 1000 road tankers, for white products in the 35 to 65 kiloliters range of capacity each. These are owned by private entrepreneurs operating under agreed, official tariffs.

There is a fleet of about 40 LPG road tankers, also private.

Rail transport is operated by *SITARAIL* through the Abidjan-Bobo Dioulasso-Ouagadougou axis. SITARAIL owns its own product tankwagons.

SONABHY has two product storage depots in Burkina. Their capacities by product grade are shown in Table A4.4

Table A4.4: SONABHY STORAGE DEPOTS Capacities m^3

	Bingo (Ouagadougou)	**Bobo Dioulasso**
Premium Gasoline	5,000	2,000
Regular Gasoline	12,000	9,000
Kerosene	4,000	3,000
Gasoil	11,000	9,000
DDO	5,000	3,000
Total Liquids	**37,000**	**26,000**
LPG	1,429	179
Total all Products	**38,429**	**26,179**

Both these installations have rail and road tanker unloading; road tanker loading and LPG bottling.

There is no storage at SONABHY for Fuel oil or jet fuel as these are supplied directly to clients from coastal depots.

Note on Long-Distance Trucking: It is common practice in the long-distance oil product trucking business serving Burkina Faso and West Africa in general, to acquire second-hand vehicles from Europe and reconstruct the tanks so that they carry as much as 60, 000 liters. This is an enormous load. In principle, the axle load standard is 11.5 tonnes per axle (ECOWAS & Euro Standard). In practice, enforcement of these standards is deficient and there is significant overloading. The state of the highways is bad due to this overloading and lack of maintenance. The road tanker fleet serving Burkina is, on average, in poor condition.

Another aspect of long-distance trucking is the large number of formal and informal charges that must be paid on the routes between coastal depots and their inland depot destinations. These high costs contribute to the action of the trucker to economize in other ways such as overloading.

If rules and regulations were enforced and modernization of the fleet and operating practices encouraged, the effective tariffs, taking into account informal charges, might actually be reduced.

3. Market

Table A4.5 summarizes the evolution in the domestic market for oil products in Burkina for the period 2003-2007. The total market amounted to some 592 000 m^3 in 2007, up from 426 000 in 2003 for an annual compound growth rate of 8.5%. The growth has been particularly strong in the vehicle carburetion fuels, gasoline and gasoil, both with p.a. growth rates in excess of 13% for the period.

Table A4.5: Historical Demand for Petroleum Products in Burkina Faso, 10^3 m^3

White Products	2003	2004	2005	2006	2007	% p.a. growth
Gasoline Super	13	13	117	168	204	*100.9%*
Gasoline Regular	112	120	19	0	0	*-100.0%*
Total Gasoline	124	133	136	168	204	*13.2%*
Kerosene	45	34	26	28	31	*-8.8%*
Jet	18	20	25	22	12	*-9.3%*
Gasoil (autodiesel)	114	126	135	169	188	*13.3%*
Sub-total WP	**301**	**314**	**322**	**387**	**435**	***9.7%***
Black Products						
Diesel Distillate Oil (DDO)	90	80	81	83	62	*-9.0%*
Fuel Oil 180 Cst	25	34	35	66	74	*31.5%*
Sub-total BP	**115**	**114**	**116**	**148**	**136**	***4.2%***
LPG (tm)	10	13	13	17	21	*18.9%*
GRAND TOTAL	**426**	**440**	**451**	**553**	**592**	***8.5%***

With gasoline consumption exceeding that of gasoil and maintaining a strong growth rate, it is interesting to note that Burkina has not had the same degree of dieselization of the vehicle fleet that the other West African countries have had. Burkina's gasoline consumption represents 29% of the 5 country total. A comparison of price differentials between gasoline and gasoil prices in the 5 countries doesn't indicate a significantly lower margin in Burkina vs the other countries as a causal effect. Further analysis would have to be done regarding vehicle import patterns and policies, including the impact of the large presence of motorcycles in Burkina, using the 2-stroke lubricant-gasoline mix.

4. Pricing & Taxation

Petroleum product prices in Burkina Faso are controlled using an import parity structure. Margins, pump prices and prices to large consumers are regulated. Final prices take into account public finance requirements and the purchasing power of final consumers. Prices are adjusted monthly in accordance with a Ministry of Commerce decree, in line with changes in international markets for oil products and marine freight.

The basis for the CIF Price Coastal Depot is not transparent. In principle, SONABHY calculates this monthly based on a composite of their actual procurement results. In practice during the 2007-2008 extreme run-up in international prices, SONABHY maintained this value at a level lower than actual costs as a means of stabilizing the ex-depot prices and attendant pump prices to final consumers. In other words the automatic adjustment process was abandoned due to political intervention to cushion the public from the full effects of the price increases. It was the accounts of SONABHY which acted as the absorption modality for this "stabilization". They went extremely negative during 2008[8]. With the decline in international prices of 2nd half 2008, the level of the CIF Price and the attendant pump prices have been moderated somewhat but maintained above actual costs. They are now in "recovery mode" regarding SONABHY's

[8] From *SIDWAYA* (Ouagadougo) INTERNET article July 14, 2008 : « Avec un baril de pétrole à 147 dollars US (61 740 F CFA), la Société nationale burkinabè des hydrocarbures (SONABHY) qui a perdu près de 23 milliards de F CFA ne pouvait plus continuer à subventionner les hydrocarbures au Burkina.»… AND "La SONABHY n'est pas en faillite, mais si rien n'est fait, le pire peut advenir", a dit Jean Hubert Yaméogo au cours du point de presse du gouvernement.

accounts. It is not certain how well this stabilization financial exercise has been formally accounted for. The official prices effective for the month of December, 2008 are shown in Table A4.6. They reflect the current recovery mode of SONABHY, with the CIF price, ex-depot prices and attendant pump prices above true cost realizations for the month.

Table A4.6: Burkina Faso Retail Price Structure, FCFA/litre Based on Bingo Depot Near Ouagadougou Effective December, 2008

	Gasoline Super	Kerosene	Gasoil
CIF Price Coastal Depot	269.30	310.14	327.81
Coastal Depot throughput fee	15.55	15.53	15.19
Transport & Transit Costs to Bingo	43.39	43.39	43.39
Importer/Depot Margin	27.97	28.07	27.96
Ex-Depot Bingo excl tax	**356.21**	**397.13**	**414.35**
Customs	35.77	22.87	42.46
Tax On Petroleum Products	125.00	0.00	50.00
TVA	88.02	0.00	86.19
Ex-Depot Bingo incl tax	**605.00**	**420.00**	**593.00**
Distributors' Margin	36.00	25.00	40.00
Retail Margin	24.00	25.00	22.00
Pump Price	**665.00**	**470.00**	**655.00**

The graph, Figure A4.2, provides an illustration of the evolution in Burkina's pump prices compared with the WTI reference crude price over this 2007-2008 period of extreme price escalation. It also shows in rough terms, that prices were kept below cost-recovery levels during the peaking period and are now above such levels while SONABHY rehabilitates its accounts.

Since the pump price curves and WTI price curve are plotted against two separate axes, each with different units, the intent here was to compare the shape of the product curves vs the shape of one common unit of international reference price to illustrate the pump price stabilization which occurred. There was no intent to portray any quantitative comparison between the product curves and the international price curve.

The graphs included as Figures A4.3, A4.4 and A4.5 provides this quantitative comparison for the three key products gasoline, kerosene and gasoil. The graphs are plots of the pump price for each product vs. the respective Spot FOB Med reference prices for the same period both expressed in the same currency units. The differential between pump price and Spot price is included in the same plot.

Figure A4.2

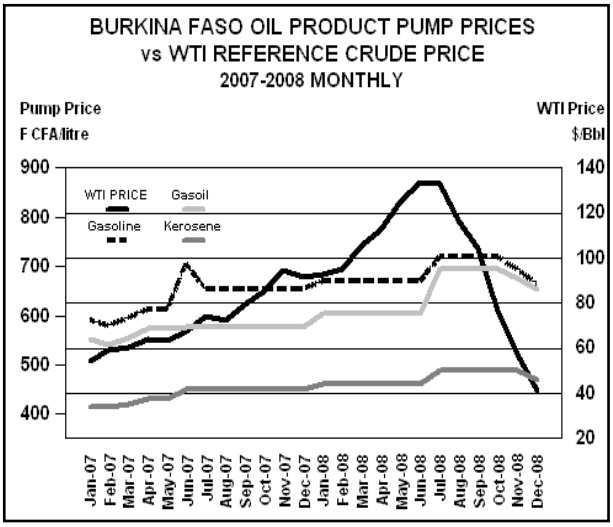


Figure A4.3

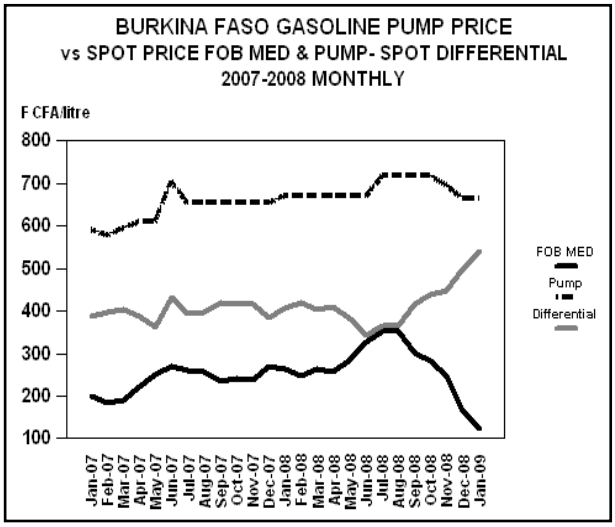


Figure A4.4

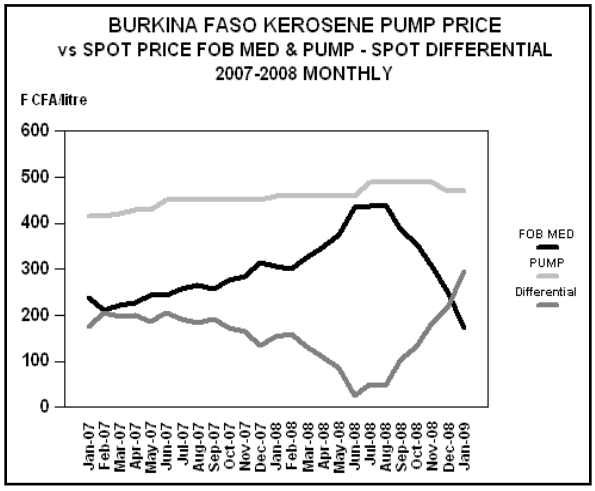
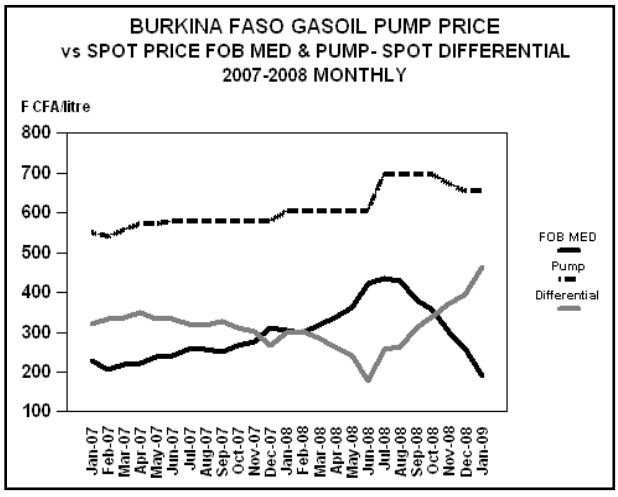


Figure A4.5



Prices in the two main population centers reflect real transport costs from main supply point(s); For example Bobo Dioulasso prices are lower than those in Ouagadougou, being closer in the supply chain to the main supply point. Table A4.7 illustrates these price differentials for selected months of year 2007 (average).

Table A4.7: Pump Prices 2007, FCFA/liter, Ouagadougou					
	Premium Gasoline	**Kerosene**	**Gasoil**	**DDO**	**Mix (2stroke)**
January	590	415	551	386	580
February	579	415	540	375	570
March	595	420	556	388	585
April	612	430	573	391	600
Bobo Dioulasso					
	Premium Gasoline	**Kerosene**	**Gasoil**	**DDO**	**Mix (2stroke)**
January	579	400	531	373	570
February	568	400	519	362	560
March	583	410	535	375	575
April	600	420	553	378	590

5. Other Sector Issues & Findings

1) Legal, Regulatory and Institutional Structure: Burkina Faso lacks a comprehensive law and attendant regulations for the downstream petroleum sector as well as a central, unified regulating body. With the presence of a strong State company like SONABHY controlling a major portion of the sector and regulating itself, and to an extent other aspects of the sector, it is often perceived that this is not required. Even with the presence of SONABHY there should be a regulating function independent of the state company. With the possibility of a privatization of SONABHY, Burkina would have an urgent need for proper legislation and a regulating entity.

2) Price Stabilization: The approach to stabilization should be clearly established. The rules should be laid out in terms of the state company, SONABHY's, revenues to be maintained and at what point price increases are triggered in order to recover lost revenues in an orderly, phased fashion.

3) Fraudulent Practices There are a couple of "dumping" practices which cause both the formal distributors and the state to lose revenue:

   - Because of logistics problems in the rebel zone of northern Côte d'Ivoire the zone is supplied by backhauling product southward from Bobo-Dioulasso depot. This product is tax-free and some volumes end up being dumped in Bobo-area stations or sold in containers.

- Mali suppliers/truckers traversing Burkina in the north have been known to collaborate with station dealers to dump small portions of their load in Burkina stations.

4) Valuation of Potential Cost Efficiency: The State bulk supply and storage company, SONABHY, has been benchmarked in the past for procurement performance and found to be close to "best practice". As regards the depot management and overall administration an efficiency audit or benchmarking has not been performed. It is felt that an audit/benchmarking exercise on this portion of the business would identify efficiency programs and investments which could lead to savings. For purposes of cost efficiency valuation it has been assumed that a 10% reduction in SONABHY's total costs and hence gross margin requirements could be achieved. With a gross margin of 28 F CFA/liter in the price structure this would result in a 2.8 F CFA/liter reduction in the pump prices per product. This amounts to a reduction of 0.5% in average pump prices over the 2007-2008 period. The annual amount equates to 1.7 billion F CFA or some US$ 3.6 million at current exchange rates.

Annex 5 Côte d'Ivoire

1. Legal, Regulatory, Institutional framework – Sector Organization

1.1 Introduction

The Ministry responsible for oversight of the oil products sector in Côte D'Ivoire is the Ministry of Mines and Energy (*Ministère des Mines et de l'Energie, MME*). The Minister and his office are responsible for the establishment of policy with regard to the upstream and downstream petroleum sector. The responsibilities include the approval, issuance and supervision of operating licenses for the various operators in the sector.

Within MME the Direction of Hydrocarbons (*Direction des Hydrocarbures, DH)* is the organization responsible for applying national policy in regard to all issues to do with upstream and downstream hydrocarbons. In the downstream this includes refining, storage, distribution and transport of oil products in the entire country

Table A5.1: Cote d'Ivoire Downstream Oil Sector Legal, Regulatory & Institutional Framework

Population, 2007, millions	19.3
GDP per capita, Atlas *(WB WDI 10 sep 08)*	$1,016
Percent of oil products imported	5%
Degree of socio-political freedom *(Freedom House 2009)*	Not Free
Government Participation in:	
Refining	69%
Importing Oil Products	100%
Logistics (Storage) Infrastructure	Significant
Marketing Oil Products	PETROCI
Contingency/Strategic Stocks	Yes
Existence of Comprehensive, Modern Downstream Legislation; COMMENTS	NO; only disparate, dated texts relating to price, licensing, fraud, safety; are working on Downstream Law
Rating 1-10	3
Existence of centralized, specialized Downstream Regulatory Institution (s); COMMENTS	NO, DH under Min doesn't do much; issues licenses and, in principle, oversees licensees but implementation weak
Rating 1-10	4
Oversight and Enforcement	Weak

1.2 Legal/Regulatory Framework

There is no comprehensive Downstream Law and regulations governing the sector. The regulatory framework for both upstream and downstream include the following texts:

Existing

- Law n°96-669 of 29 Aug 1996 regarding the Petroleum Code ;
- Law n°92-469 of 30 July 1992 regarding repression of fraud in the petroleum products area and violations in technical safety practices.
- Decree n°96-733 du 19 Sept 1996 regarding modalities for applying the law relative to the Petroleum Code.
- Decree n° 2005-04 6 January 2005 concerning specifications for petroleum products.
- Inter-ministerial Administrative Order n° 160 MC/MEF 1st décembre 1975 determining the conditions for fixing the price of certain petroleum products

Drafts in Progress

- Review of the entire legal/regulatory framework by the firm *Booz Allen & Hamilton*;
- Gas Code.

Texts Common to both Mining and Petroleum Sectors

- Law n°95-620 of 03 Aug 1995 regarding the Investment Codes and related regulatory texts,
- Law n°96-766 of 03 Oct 1996 regarding the Environmental Code and related regulatory texts,
- General Tax Code
- Customs Code

The listing above is very much interalia with regard to the total array of disparate, dated and incomplete texts which have some reference to activities in the downstream sector. As indicated there is work underway by consultants to study the entire upstream and downstream with a view to modernizing and rationalizing it. It is understood that this would include the preparation of a specific, specialized Law pertaining to the downstream sector with attendant comprehensive regulations.

1.3 Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled Enterprises

PETROCI (*Société Nationale d'Operations Pétrolières*)

PETROCI is the state oil and gas company of Côte D'Ivoire. It reports to MME. It was originally principally involved in the upstream resource identification and exploitation area, but over recent years has become involved in several downstream areas:

- LPG distribution- market leader position with some 29% of the market
- It holds the CI government's shares in the local oil refinery SIR
- It owns and operates two oil product marine jetties on the Vridi canal along with interconnecting pipelines among the Vridi refining, storage and port infrastructure
- It recently acquired the assets and business of the multinational OMC Chevron/Texaco giving it the number 2 position in oil product distribution market share at 19%.

SIR *(Société Ivoirienne de Raffinage)*

SIR is Côte d'Ivoire's only oil refinery and is located in Abidjan (Vridi). Relative to other regional operations, it is a major processing facility with a capacity of 75,000 bpcd (3.8 million t/yr). It is a relatively complex refinery with vacuum distillation and hydrocracking units for upgrading of bottoms. The SIR shares are majority owned by the government of Côte d'Ivoire (through PETROCI), with minority ownerships by the government of Burkina Faso and TOTAL as follows[9]:

CI government/PETROCI	69.3%

[9] This ownership has changed fairly recently: Shell, Exxonmobil and Chevron were shareholders as well but "sold" their shares to PETROCI raising government ownership from 49% to 69%.

Government of Burkina Faso	5.3%
TOTAL	25.4%
	100.0%

SIR reports to MME and is charged with assuring secure petroleum products to Côte D'Ivoire.

SIR has been assigned by law the monopoly right to handle all imports of LPG and oil products. All the supply to the domestic market whether from refining or imported as finished product is channeled through SIR.

SMB*(Société Multinationale de Bitume)*

SMB consists of an asphalt processing facility located within the battery limits of SIR and integrated closely with the SIR processing facilities. It also reports to MME and is charged with supplying asphalt for Côte D'Ivoire's road building and maintenance activities.

The government also owns the majority share of SMB through the SIR/PETROCI connection, with minority shareholders Shell Côte d'Ivoire and widely-held private CI investors as follows:

SIR	66.04%
Widely held	28.21%
Shell Côte d'Ivoire	5.75%
	100.00%

GESTOCI *(Société de Gestion des Stocks de Sécurité*)

GESTOCI is a storage terminal operating company charged with the maintenance of security stocks of petroleum products for CI. Although it is 87.5% owned by the multinational oil companies, 12.5% by the state, it operates effectively as a state company. In addition to maintaining security stocks it facilitates the operation of "independent" distributors through operation of its main Abidjan (Vridi) terminal as an open-access facility.

Private Sector

MSTT (Libya Oil, Shell, (Texaco- now PETROCI), Total "Pooled" Storage Terminals)

This comprises the storage terminals of the multinationals in the Vridi area formerly operated by the individual companies but which are now pooled.

Private Distributors

There are three affiliates of multinationals – Total, Shell and Libya Oil, plus the state-owned company PETROCI as well as some 19 Ivoirienne owned "independents". Table A5.2 is a summary of the 2008 market shares for the distribution of all oil products excluding LPG. Applying structural criteria of industry concentration from the table as follows:

- Market Leader 25%,
- Top Four 75%
- Herfindahl-Hirschman Index (HHI) of 1544

It may be concluded that the Côte d'Ivoire oil products market is of medium concentration with moderate potential for market domination by a combination of the players.

Table A5.2: Cote d'Ivoire Oil Product Distribution Market Shares, Jan-Sep 2008, Excluidng LP

Companies	Tonnes	Share	Cumulative Share	H-H Index
TOTAL CI	153,124	24.6%	24.6%	604.9
PETROCI	116,515	18.7%	43.3%	350.3
SHELL	103,675	16.7%	60.0%	277.3
LIBYA OIL	92,687	14.9%	74.9%	221.6
PETRO IVOIRE	50,004	8.0%	82.9%	64.5
ROYAL	16,284	2.6%	85.5%	6.8
ESSENCI	13,331	2.1%	87.6%	4.6
LUBAFRIQUE	13,316	2.1%	89.8%	4.6
AFRICAN PETROLEUM	9,409	1.5%	91.3%	2.3
IDC IVOIRIENNE DHC	7,321	1.2%	92.5%	1.4
VINKO PETROLEUM	5,903	0.9%	93.4%	0.9
ANDA OIL	5,634	0.9%	94.3%	0.8
SODEPCI	5,437	0.9%	95.2%	0.8
SOC AFRICAINE DE PP	5,415	0.9%	96.1%	0.8
PETRO OIL	3,927	0.6%	96.7%	0.4
KLENZI DISTRIB	4,712	0.8%	97.4%	0.6
PRIDE	3,749	0.6%	98.1%	0.4
FIRST PETROLEUM	3,706	0.6%	98.6%	0.4
SARA PETROLEUM	2,849	0.5%	99.1%	0.2
AFRIQ OIL	2,780	0.4%	99.6%	0.2
BV PETROGAZ	2,128	0.3%	99.9%	0.1
YAD PETROLEUM	580	0.1%	100.0%	0.0
STAR	84	0.0%	100.0%	0.0

LPG Sector

Entities involved in various aspects of the LPG business in Côte d'Ivoire are summarized as follows:

Supply

SIR produces from its refining operations as well as importing the quantity of LPG that the country is in deficit

A company called *"Lion*" recovers LPG from associated gas produced with crude oil production at the Lion field. This LPG is used domestically.

Bottling & Distribution

Table A5.3 is a summary of the companies involved and their 2008 market shares. The state oil company PETROCI (*PETROCI-Gaz*) is the major operator here. Closely followed by ORYX, the marketing affiliate of Addax, which is being quite aggressive in the LPG market in the entire West African region. Together these two have some 58% of the market. Other operators are the affiliates of the multinationals, Total, Libya Oil as well as nine locally-owned companies, the largest of which is Petro-Ivoire.

Table A5.3: Cote d'Ivoire LPG Distribution Market Shares, Jan-Sep 2008

Companies	Tonnes	Share	Cumulative Share	H-H Index
PETROCI	22,690	29.4%	29.4%	865.9
ORYX	22,275	28.9%	58.3%	834.5
TOTAL CI	15,553	20.2%	78.5%	406.8
LIBYA OIL	5,254	6.8%	85.3%	46.4
PETRO IVOIRE	4,360	5.7%	91.0%	32.0
GROUPE SWANN	2,310	3.0%	93.9%	9.0
BV PETROGAZ	1,490	1.9%	95.9%	3.7
PETRO OIL	999	1.3%	97.2%	1.7
ESSENCI	818	1.1%	98.2%	1.1
SARA PETROLEUM	807	1.0%	99.3%	1.1
AFRICAN PETROLEUM	255	0.3%	99.6%	0.1
ANDA OIL	217	0.3%	99.9%	0.1
SIMAM	80	0.1%	100.0%	0.0
TOTAL	**77,108**	**100.0%**		**2,202**

Applying structural criteria of industry concentration from the table as follows

- Market Leader 29%,
- Top Four 85%
- Herfindahl-Hirschman Index (HHI) of 2202

It may be concluded that the Côte d'Ivoire market for LPG is of medium-high concentration with some potential for market domination by a combination of the players.

2. Supply, Procurement Arrangements and Infrastructure

2.1 Refining and Product Supply

Côte d'Ivoire has a major oil refinery in Abidjan, Société Ivoirienne de Raffinage (SIR) with a capacity of 75,000 bpcd (3.8 million t/yr). It is a relatively complex refinery with vacuum distillation and hydrocracking units for upgrading of heavy residual material which would normally be produced and sold as relatively low value heavy fuel oil in a simple, skimming refinery. The secondary distillation and cracking results in a higher production of light products such as gasoline and light distillates at the expense of heavy fuel oil.

The text box indicates key capacity and configuration data on the refinery.

SIR Refinery, Abidjan

Principal Processing Units

- *Atmospheric Distillation 2 units, total 75 000 bpcd*
- *Vacuum distillation 25 000 bpcd*
- *Catalytic reforming 2 units, total 13 000 bpd*
- *Catalytic Hydrocracking 14 500 bpd*
- *Naphtha Hydrotreating , 27 000 bpd*
- *Hydrogen Unit*

Typical Crudes Processed

Domestic: Baobab, Lion, Espoir

Foreign/Nigerian: Bonny Light, Forcados, Escravos

Product Grades Produced

- *Butane*
- *Gasoline -premium unleaded*
- *Kerosene*
- *Jet A1*
- *Gas Oil*
- *Diesel Distillate Oil*
- *Fuel oil 180 et 380*

Although it uses some limited volumes of domestic crude oil, its major crude supply is from Nigeria through a combination of a yearly allocated amount supplemented by spot purchases acquired through competitive bidding. Because of the internal conflict and attendant country risk they had to abandon the previous dominant supply modality of international competitive bidding. Nigerian sweet light crudes are best-suited to the SIR facility and required product yields, with Forcados being the optimal.

SIR has more than three times the capacity of the domestic market requirement. The surplus is exported via rail and road serving the transit business in the Sahelian landlocked countries of Burkina Faso and Mali. There is also significant marine cargo export business, comprising direct sales by SIR and through international/regional traders.

Table A5.4 summarizes the refinery product yields by main product line for the year 2006.

Table A5.4: SIR Average Product Yields 2006

Product	Yield wgt%
Butane	1
Gasoline	20
Kérosène	23
Gasoil	29
Distillate	9
Fuel Oil	18
TOTAL	**100**

As indicated the most important market by far for SIR is the export cargo business, taking 70% of the output. The disposition of total SIR output by type of market for 2007 is shown in Table A5.5.

Table A5.5: SIR Sales by Major Market, 2007

Markets	Tonnes	Proportion
Côte D'Ivoire Market- Land	929	28%
Transit Export Business – Land (Burkina, Chad, Mali, Niger)	362	11%
Cargo Exports – Sea	2 031	61%
TOTAL	**3 322**	**100%**

As noted in the flowsheet, the asphalt producing facility, SMB, is actually located within the battery limits of the refinery. This of course makes sense from a process integration standpoint. Penetration asphalt grades are produced from the atmospheric and vacuum distillation of appropriate quality heavy crudes and the lighter fractions are integrated into the SIR processing proper. The asphalt production capability is about 4 000 b/d.

In addition to being responsible for all exports of oil products from Côte d'Ivoire, SIR has the monopoly on any product imports that may be required to meet deficits in domestic production. All product imports must be channeled through SIR. The distribution operators are not permitted to import finished fuel products. In practice, this mainly applies to LPG (Gaz butane), since production of the other products is usually surplus to the country's requirements.

It should also be noted that this monopoly restriction also applies to transit countries. Any products imported through Abidjan/Vridi by the landlocked countries must be acquired from SIR (loaded on road tankers and/or railwagons through GESTOCI). The landlocked Sahelian countries do not have the right/freedom to procure and import their own products through Abidjan/Vridi receiving terminals.

2.2 Oil Product Storage

There are two oil products storage companies, Société de Gestion des Stocks Pétroliers de la Côte d'Ivoire (*GESTOCI).* And *MSTT* (Libya Oil, Shell, Total and PETROCI (took over Chevron/Texaco) "Pool" storage)

The principal storage terminal of GESTOCI is in the Abidjan (Vridi) port area near the refinery. They store oil products and LPG in the main depot and have two upcountry depots as well – in Yamassoukro and Bouaké.[10] There are transfer lines linking GESTOCI main depot with the refinery, the port/dock and with the MSTT depots.

The Yamassoukro depot of GESTOCI is supplied by road tanker while the Bouaké depot by rail, both from the main terminal in Vridi.

[10] The Bouaké facility is out of service due to the internal conflct.

Table A5.6 provides a summary of GESTOCI storage capacity

The MSTT pooled storage in Vridi totals some 80 000 m^3 of capacity in two separate installations

Table A5.6: GESTOCI Oil Product Storage	
Location	$10^3 m^3$
Abidjan/Vridi	320
Yamassoukro	32
Bouaké	48
TOTAL	**400**

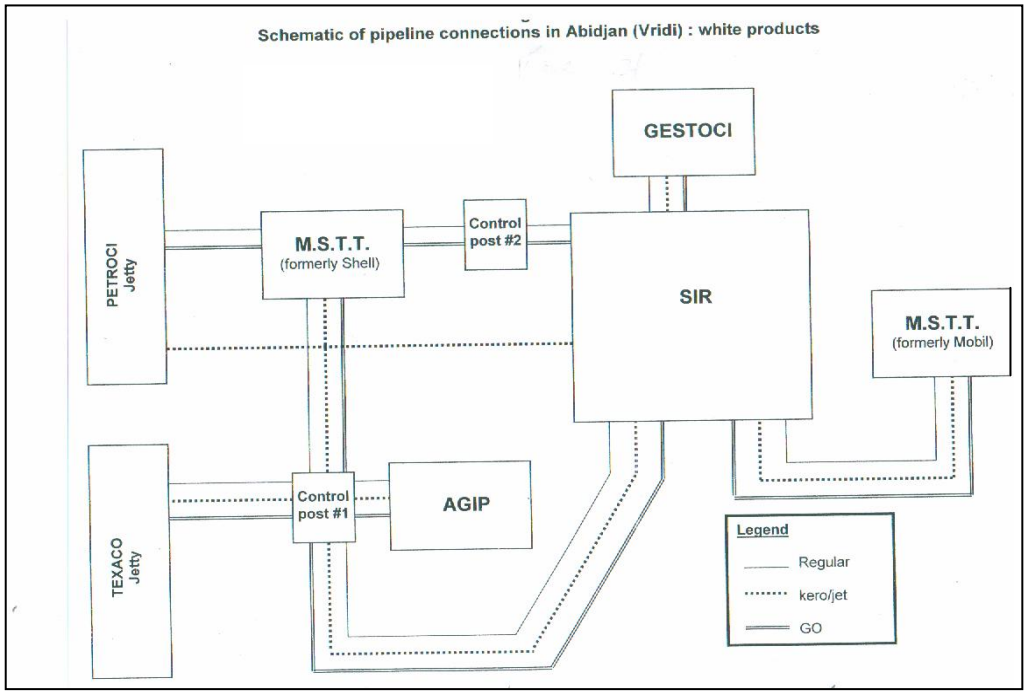
2.3 Oil Jetties and Transfer Facilities

PETROCI owns and operates a number of logistics facilities in the Vridi area:

- 2 petroleum product jetties on the Vridi canal allowing the reception of imports and loading/export of finished product cargoes
- A network of 28 km of pipeline connections in the Vridi area linking the jetties with SIR, GESTOCI and MSTT storage.

Figure A5.1[11] provides a schematic of the supply infrastructure installations in Vridi and the linkages among them.

Figure A5.1: Schematic of pipeline connection in Abudjan (Vridi): while products



2.4 LPG

Although SIR is an important producer of LPG and there is production from associated natural gas, there is still a significant deficit which must be imported. Imports are of the order of 60, 000 t/yr. This has been procured by SIR under direct negotiated single cargo arrangements with traders. This dependence on procurement through "Spot " cargoes has been questioned.

[11] Reprinted from Source: Fred Sexsmith *"Privatization of 3 oil depots managed by GESTOCI"* Oct 1999.

Generally a supply modality based on multi-cargo, term arrangements tied to regional marker prices on day of loading would be more efficient.

Total receiving storage for LPG is about 4000 tonnes and typical import cargo size is 1,500 - 2000 tonnes. Storage is limited in relation to both ideal cargo size and the total market volume.

2.5 Railway Abidjan-Bouaké-Bobo-Dioulasso-Ouagadougou

The Abidjan-Ouagadougou railway is a 1,260-km single track metric line constructed between 1905 and 1954 connecting the port of Abidjan in Côte d'Ivoire with Ouagadougou, the capital of Burkina Faso. It passes through the city of Bouaké in northern Côte d'Ivoire as well as Bobo Dioulasso, the second largest city in Burkina en route to Ouagadougou.

The railway is jointly owned by the governments of Côte d'Ivoire and Burkina Faso and in 1993 was put out on a concession basis to a private group *SITARAIL*.

An important part of its business is the shipment of oil products from Abidjan to Bobo-Dioulasso and Ouagadougou.[12] Apart from the Burkina supply from Bobo a portion of the Mali market is served by truckers who load Abidjan/SIR product in Bobo.

At present SITARAIL has 122 tankwagons of 42 to 50 m^3 capacity and 22 special jet fuel containers of 19 to 20 m^3 capacity for shipping product. The total volume transported in 2008 was 228 592 m^3 of which 205 751 for Burkina/SONABHY and 23 201 m^3 for Mali which was lifted from Bobo by various Malian truckers.

The travel time to Bobo is 38 hours and to Bingo depot Ouaga 48 hours. The average tankwagon turnaround time is about 1 week.

The maximum volume that could be transported with present equipment and turnaround times is about 300 000 m^3 per year.

The present tariff is 36 000 F CFA/m^3 to Bobo and to Bingo 42,000 m^3. There is a standard adjustment built in to the tariff for DDO fuel cost escalation and less frequent adjustments for changes in other costs.

Under normal circumstances the transport of petroleum products from SIR to northern Côte d'Ivoire and to Burkina has represented some 40% of SITARAIL's revenues. Its finances are very sensitive to the volume of petroleum products shipped since it has such a high fixed cost structure. Any effect on this volume such as could be caused by the CI conflict, less procurement by SONABHY from SIR, or as has been discussed a products pipeline[13] connecting Abidjan/Vridi with Bobo could pose a major threat to the viability of the rail operation.

Figure A5.2 is a schematic map showing supply sources and transport modes for Côte d'Ivoire.

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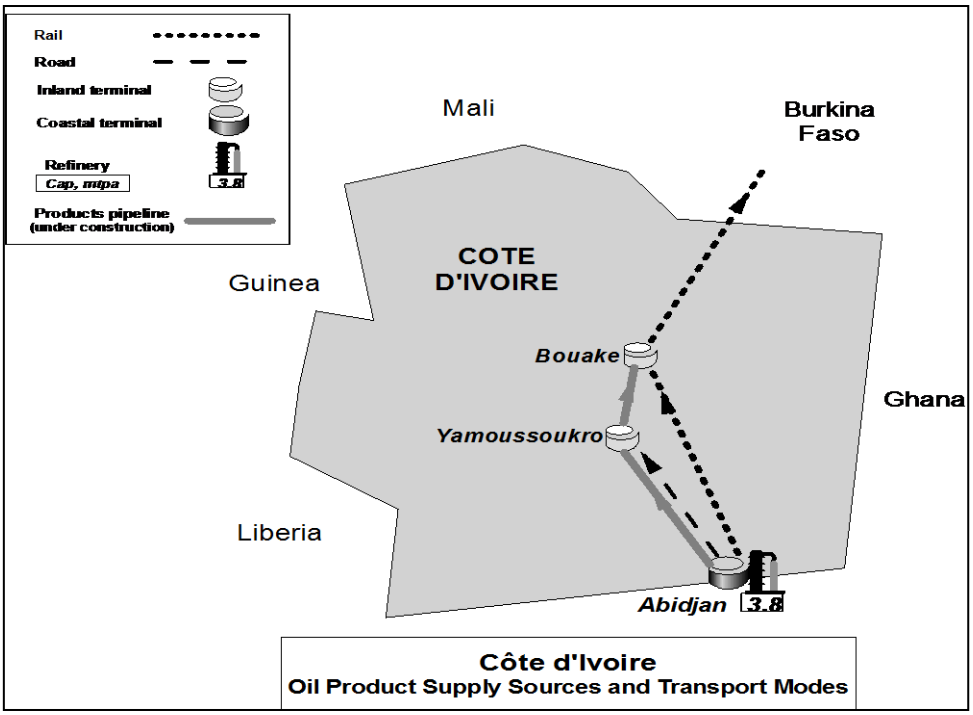
[12] Shipments to the GESTOCI depot in Bouaké were also important in the past but have been halted due to the internal conflict rendering the Bouaké facility unusable.

[13] PETROCI is in the process of building a products pipeline from Vridi to Yamassoukro under Islamic Bank financing. Pending a resolution of the internal CI conflct this could eventually be extended to Bouaké and possibly on to Bobo-Dioulasso.

Figure A5.2: Cote d'Ivoire Oil Product Supply Sources and Trans.



3. Market

Table A5.7 summarizes the evolution in the Côte d'Ivoire domestic market for oil products for the period 2003-2007. The total demand in 2007 was 1 034 000 m^3 up from 907 000 in 2003.

Table A5.7: Historical Demand and for Petroleum Products in Côte d'Voire, 10^3 m^3

White Products	2003	2004	2005	2006	2007	% p.a. growth
Total Gasoline	128	132	136	137	135	*1.3%*
Kerosene	61	82	46	47	93	*10.8%*
Jet	72	55	57	51	42	*-12.6%*
Gasoil (autodiesel)	506	551	510	507	622	*5.3%*
Sub-total WP	**767**	**821**	**748**	**742**	**892**	***3.8%***
Black Products						
Diesel Distillate Oil (DDO)	17	16	13	15	11	*-9.6%*
Fuel Oil 180 Cst	37	41	39	26	32	*-3.9%*
Fuel Oil 380 Cst	9	20	0	35	15	*11.7%*
Sub-total BP	**63**	**77**	**53**	**76**	**57**	***-2.4%***
LPG (tm)	**77**	**78**	**64**	**73**	**85**	***2.6%***
TOTAL ALL PRODUCTS	**907**	**975**	**865**	**891**	**1034**	***3.3%***

This represents an annual compound growth rate of 3.3% over the period. This is sluggish growth compared with the regional average of 6% p.a. over the same period. No doubt this reflects the continuing economic and investment risk factor impacts of the internal conflict. The consumption of industrial diesel and fuel oil 180 have actually declined over the period, while gasoline has exhibited an almost flat profile at 1.3% p.a. growth over the period.

Note on Gasoil Demand Pattern

1 Generic - in Developing Countries

Gasoil is the most heterogeneous oil product in terms of sectoral demand. Unlike gasoline, a product dispensed at the pumps solely for automotive use, it is a major product sold in bulk for use in power generation, general industry, mining and agriculture, in addition to automotive use. These bulk uses, particularly in small economies, can be quite "lumpy" year-to year. Power generation is affected by availability of other generation options such as hydraulic and attendant water levels. Industries are affected by startups and shutdowns of plant.

2 Specific to Cote d'Ivoire

Cote d'Ivoire is emerging from several years of civil unrest and armed conflict. It has not yet resolved this situation but has made some recovery since a truce in early 2007. This has undoubtedly affected its economy and attendant oil product consumption profile. It is perhaps no coincidence , therefore that gasoil consumption was flat during the conflict years (2003-2006) and picked up during the year (2007) when at least a partial recovery has been made. It would be instructive to extend the pre-conflict trend in gasoil consumption across the conflict period to project what gasoil consumption would have been if the conflict had not occurred. This is an approach used by the consultant in Liberia with some success in order to project post-conflict recovery oil product demand there.

These are possible explanations for the observed increase in gasoil consumption 2006-2007 in accordance with the official SIR figures provided in Table A2.7. More data would have to be gathered in order to confirm these hypotheses.

4. Pricing & Taxation

The petroleum product prices to final consumers in Côte D'Ivoire are controlled under a formal, import parity price (IPP) structure.

In accord with a classic IPP structure, the theoretical cost build-up begins with a hypothetical product sourcing assumption, or FOB reference price for each product. In this case they use North West Europe (NWE), also known in the oil business as ARA (Amsterdam, Rotterdam, Anvers). Daily spot product prices are quoted for NWE by the standard pricing intelligence services such as Platt's, Bloomberg, Argus. The most common reference is Platt's and this data source for Spot prices is usually specified in price structures.

To the FOB price assumption is added marine freight based on the freight market and related parameters such as cargo insurance and losses. The final elements relate to the port charges and unloading costs. The sum of these factors results in a hypothetical landed cost for each product. This cost in turn represents the ex-refinery price received by SIR from the distributors

In the case of Côte D'Ivoire, with its SIR refinery to consider, an extra factor is added to the IPP structure. This could be termed the "refinery protection coefficient". It is in the form of a coefficient (1+k) which is multiplied by the raw IPP sum/landed cost in order to add some extra fat to the structure in order to protect the refinery from the severe impacts of full competition with imported products. When this automatic IPP structure was first introduced some years ago this factor "k" was set at 0.20 or 20%. In other words the raw IPP was hiked by 20% as a protection factor. To the credit of CI they have progressively reduced this factor so that it now stands at 5%. The principle behind this is that SIR is competing with international products derived from facilities of much greater capacity, complexity and sophistication and needs this protection.

Table A5.8 is a summary of the main elements of the December, 2008 pump price buildup. The starting point is the ex-refinery price, so it represents the "back-end" of the overall price structure. Unfortunately it was not possible to obtain the actual IPP structure or "front-end" which corresponded to this although the formula basis for calculating it is known.

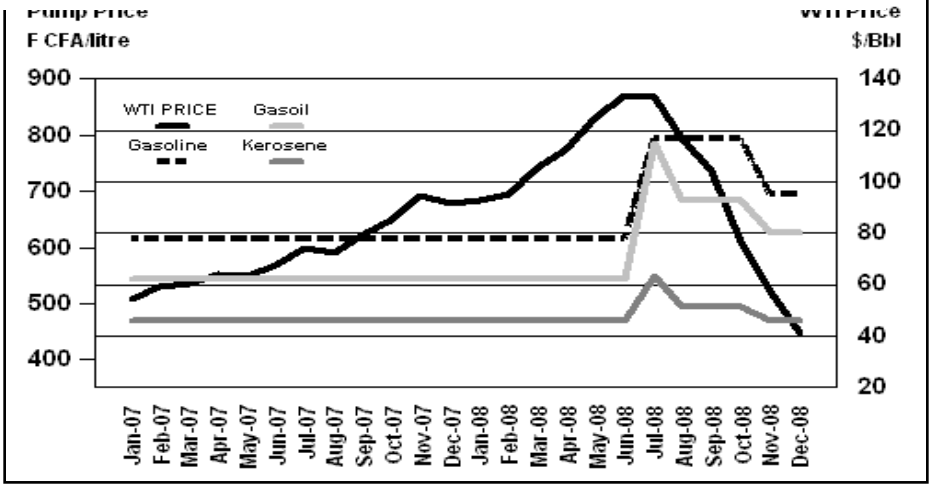
Prices are maintained the same throughout the country through a péréquation mechanism. No information was obtained on the management of this price equalization system.

Table A5.8: Cote d'Voire Retail Price Structure, FCFA/litre Effective December, 2008

	Gasoline Super	Kerosene	Gasoil
Ex-Refinery Price to Distributor	331.70	320.89	414.33
Total taxes, government take	268.12	72.89	126.94
Local/national Transport (perequation)	17.50	17.50	17.50
Distributors' Margin	58.93	41.57	48.88
Retail Margin	18.75	17.15	17.35
Pump Price	**695.00**	**470.00**	**625.00**

The graph, Figure A5.3, provides an illustration of the evolution in Côte D'Ivoire's pump prices compared with the WTI reference crude price over the 2007-2008 period of extreme price escalation.

Figure A5.3: Cote d'Ivoire Oil Product Pump Prices vs WTI Reference Crude Prices, 2007-2008 Monthly



In principle, the IPPs and attendant pump prices are calculated monthly and prices are adjusted based on actual international prices and marine freight references. In practice, during the 2007-2008 extreme run-up in international prices, this value was maintained at a level lower than actual costs as a means of stabilizing the ex-SIR prices and attendant pump prices to final consumers. In other words the automatic adjustment process was abandoned due to political

intervention in order to cushion the public from the full effects of the price increases. It was the accounts of SIR which acted as the absorption modality for this "stabilization". They went extremely negative during 2008.

In observing the graph, it appears, from the pattern of adjustment, that the price was held stable for some 18 months while the international prices soared and SIR became more and more negative on its income accounts. About mid-2008, with the international price still high and not knowing yet where the price was heading, the Côte D'Ivoire authorities implemented a major price hike.

With the decline in international prices of 2nd half 2008, the level of the IPPs and the attendant pump prices have been moderated somewhat but maintained above actual costs. They are now in "recovery mode" regarding SIR's accounts. It is not certain how well this stabilization financial exercise has been formally accounted for.

This pattern of price adjustment and political intervention illustrates one of the problems with stabilization processes, particularly ad-hoc ones. Not knowing where the international price is heading while at the same time price adjustments are delayed, it suddenly becomes essential to make a cataclysmic increase in order to maintain some measure of financial viability of the State and/or its representative, SIR.

The graphs included as Figures A5.4, A5.5 and A5.6 are plots of the pump price for each key product vs. the respective Spot FOB Med reference prices for the same period both expressed in the same currency units. The differential between pump price and Spot price is included in the same plot.

Figure A5.4: Côte d'Ivoire Gasoline Pump Price vs Spot Price FOB MED & Pump – Spot Differential, 2007 – 2008 Monthly

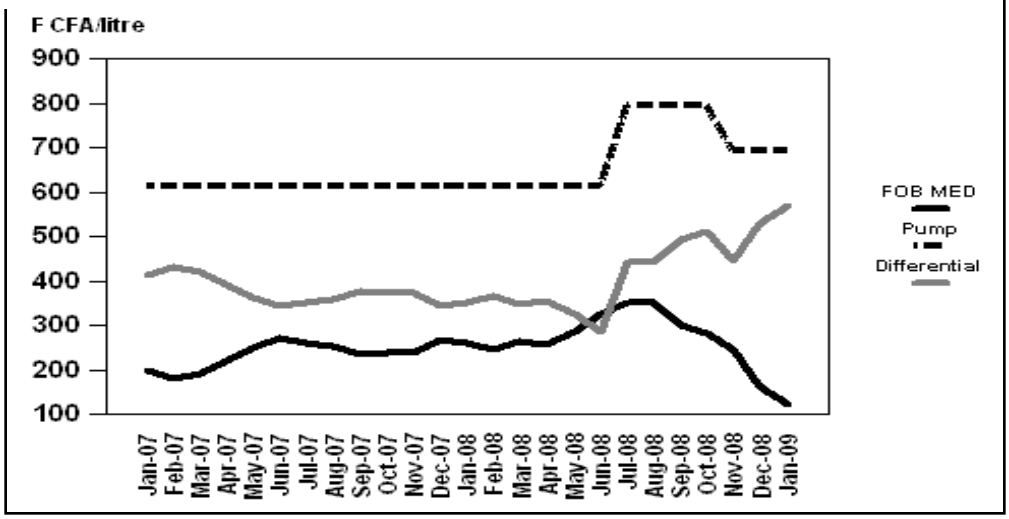


Figure A5.5: Cote d'Ivoire Gasoil Pump Price vs Spot Price FOB MED & Pump-Spot Differential, 2007-2008 Monthly

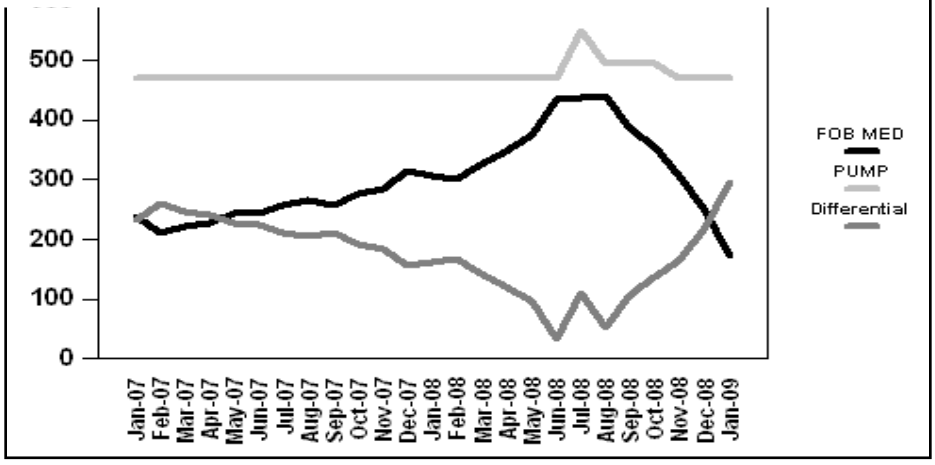
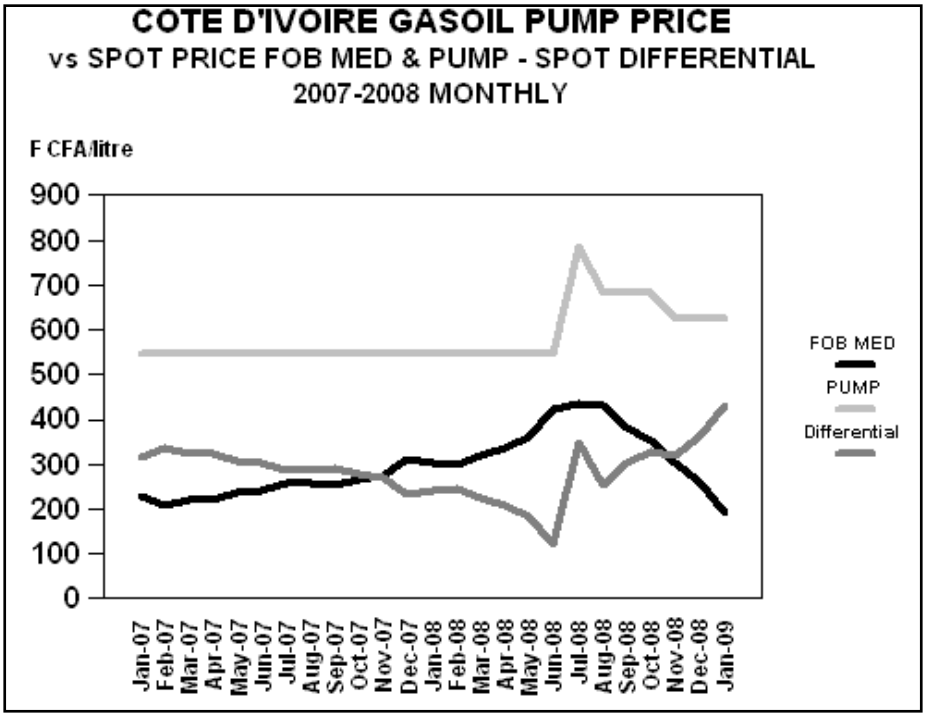


Figure A5.6: Cote d'Ivoire Kerosene Pump Price vs Spot Price FOB MED & Pump – Spot Differential, 2007-2008 Monthly



5. Other Sector Issues & Findings

1) Price Stabilization: It is understandable that governments wish to protect consumers somehow from the severe impacts of international price escalations. The approach to stabilization should be clearly established beforehand. The rules should be laid out in terms of government revenues to be maintained and at what point price increases are triggered in order to recover lost revenues to the Treasury. This would encourage a more phased in approach and avoid last minute, accelerated catch-ups in order to recover revenues, which would adversely affect consumers.

2) Valuation of Potential Cost Efficiency: The majority state-owned refinery, SIR, currently enjoys a protection in the import parity price structure equivalent to an "add-on" of 5% of IPP to the IPP which is in effect the refinery gate price for each product. A recent technical and financial audit has been performed on the refinery. Among other results the audit has identified investments in improved refinery processing and efficiency/ENCON projects which could lead to the refinery being competitive with import parity without protection. For purposes of cost efficiency valuation it has been assumed that an improvement in yield patterns and overall efficiency of the refinery results in an elimination of the 5% protection. This would result in a 15 F CFA/liter reduction in the pump prices per product, equivalent to a reduction of 2.5% in average pump prices over the 2007-2008 period. The annual amount equates to 16.5 billion F CFA or some US$ 35 million at current exchange rates.

Annex 6 Mali

1. Legal, Regulatory, Institutional framework – Sector Organization

1.1. Introduction

The principal Ministry responsible for oversight of the oil products sector in Mali is the Ministry of Economy, Industry and Commerce (MEIC). Two other Ministries have a role in the sector as well:

- Ministry of Energy and Mines, Direction Nationale de la Geologie et des Mines (DNGM),in principle collaborating with MEIC/ONAP on technical matters such as mechanical integrity, safety of installations and product quality
- Ministry of Equipment and Transport, Direction Nationale des Transports Terrestres, Maritimes et Fluviales (DNTTMF) ; because of the important role that truck transport has in the sector collaborates also with MEIC/ONAP.

6.1.2 Legal/Regulatory Framework

There is no comprehensive downstream Petroleum Law and regulations. The regulatory framework for the sector that does exist includes the following texts:

- Law creating the « Office National des Produits Pétroliers »(ONAP) Law n°92-009 of 27 Aug1992, modified by the Ordinance n°06-009/P-RM of 9 march 2006
- Interministerial Administrative Order No 95-2495/MFC-MMEH-MTPT of the 17th November, 1995, fixing the conditions for the importation of petroleum products.
- The licensing provisions and the composition of a Technical Commission set up to review applications and grant licenses are set out in two documents, the Interministerial Administrative Order No. 95-2495/MFC-MMEH-MTPT 17-11-95. and Interministerial Instruction NO. 98 001/ MICA-MF-MME-MTPT.

There are rather dated regulations on product specifications (1990) and even more obsolete legislation dating from the French colonial era on Classified Establishments (1926), Storage Depots (1928) and Service Stations (1956).

Table A6.1: Mali Downstream Oil Sector Legal, Regulatory & Institutional Framework

Population, 2007, millions	12.3
GDP per capita, Atlas *(WB WDI 10 sep 08)*	$556
Percent of oil products imported	100%
Degree of socio-political freedom *(Freedom House 2009)*	Free
Government Participation in:	
Refining	n/a
Importing Oil Products	0%
Logistics (Storage) Infrastructure	Limited
Marketing Oil Products	None
Contingency/Strategic Stocks	None
Existence of Comprehensive, Modern Downstream Legislation; COMMENTS	NO, relates mainly to price, licensing and ONAP attributions
Rating 1-10	3
Existence of centralized, specialized Downstream Regulatory Institution (s); COMMENTS	YES - but not sure how much value for money is being received.
Rating 1-10	5
Oversight and Enforcement	Mixed success; some results with contracted customs surveillance

1.3 Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled

ONAP (L'Office National des Produits Pétroliers)

ONAP is a semi-autonomous body reporting to the Ministry of Economy, Industry and Commerce. The mandate and mission of ONAP is set out in the *M/D 92-009 "Portant Creation de l'Office National des Produits Petroliers (O.N.A.P.)".* Its duties lie mainly in the area of petroleum product supply policy, supply costs, pricing, strategic stocks and general management of the sector. It negotiates supply pricing agreements with the main suppliers in each of Abidjan (SIR) and Dakar (SAR).

Although one of the principal objectives of the liberalization measures of 1992, including the creation of ONAP, was the extraction of the State from all commercial activities in the sector, ONAP owns and operates one of the three storage depots in Bamako. It operates as an open-access, service facility to any and all licensees and the stated plan is to put it out on a concession basis to the private sector. This latter measure would bring it back to consistency with the formally stated liberalization principles.

Private Sector

There are more than 50 licensed private importers in Mali. These include four multinationals, TOTAL, Shell, Star Oil and Libya Oil. The remaining 50 or so operators are Malian, ranging from BEN & CO which has the largest share of importing to a large number of small importers with 1% or less of the market. The importing activity of each importer is closely mirrored by its activity in the area of distribution. The Malian importers/distributors in particular have a major involvement with oil product trucking.

Table A6.2: Mali - Oil Company Share of Supply 2008

	Share	Cumulative Share	H-H Index
Ben & Co	15.3%	15.3%	234
TOTAL Mali	14.7%	30.0%	216
IND SOMAPP	10.2%	40.2%	104
HYDRO MALI	5.7%	45.9%	32
SOMAYAF	4.4%	50.3%	19
SHELL MALI	4.1%	54.4%	17
SOYATT	4.0%	58.4%	16
46 OTHERS for remainder	41.6%	100.0%	276
TOTAL	**100.0%**		**915**

Table A6.2 is a summary of data that was available for the share of activity by each of the top seven importers in 2008. Applying structural criteria of industry concentration from the table as follows:

- Market Leader 15%,
- Top Four 46%
- Herfindahl-Hirschman Index (HHI) of 915

It may be concluded that the Malian importing activity is of low concentration with little potential for market domination by a combination of the players. This also is reflective of the industry structure in the area of oil products distribution.

2. Supply, Procurement Arrangements and Infrastructure

2.1. Supply, Procurement Sources and Arrangements

The supply of oil products to Mali is liberalized. There are at present some 53 importers acquiring products at six coastal supply points and transporting to Mali, mostly to Bamako. There are three storage depots in Bamako served by road and rail. The only rail shipment is via TRANSRAIL from Dakar. As seen by Table A6.3, supply is now dominated by the Dakar, Senegal corridor with 41% of the total in 2008. This Dakar-Bamako movement is mostly by road. The Dakar-Bamako railway operated by TRANSRAIL only accounted for about 13 000 tonnes in 2008 or 5% of the Dakar supply. The supply from Côte d'Ivoire has dropped off over the past few years because of the conflict there while Dakar has grown because of the availability of a decent highway. Both Cotonou, Benin and Lomé, Togo are significant supply points and supply from Tema refinery, Ghana has come into its own in recent years.

The supply from Abidjan is under agreed pricing arrangements negotiated state-to-state with SIR.

Table A6.3: Mali – Petroleum Product Supply by Source, 10^3 tonnes, 2008

Coastal Supply Point	Gasoline Super	Gasoline Regular	Kerosene	Jet	Gasoil	Diesel Dist Oil (DDO)	Fuel Oil 180 CST	TOTAL	Proportion by Source
SENEGAL	8	0	0	23	240	0	0	**271**	**41.0%**
COTE D'IVOIRE	37	0	4	0	69	21	0	**132**	**19.9%**
BENIN	38	0	8	5	78	0	1	**130**	**19.7%**
TOGO	21	0	0	0	49	0	0	**70**	**10.6%**
GHANA	33	0	0	0	25	0	0	**57**	**8.7%**
MAURITANIA	0	0	0	1	0	0	0	**1**	**0.2%**
TOTAL	**137**	**0**	**12**	**29**	**461**	**21**	**1**	**662**	**100.0%**

In the case of Dakar, Senegal supply there is no longer under an official state-state SAR price. Importers are free to negotiate whatever deal they can in Dakar through the complex of depots and suppliers there. This is also the case with the supplies through Benin, Togo, Ghana and Mauritania. The Malian importers negotiate their own deals with suppliers through these coastal depots.

2.2 Oil Product Storage

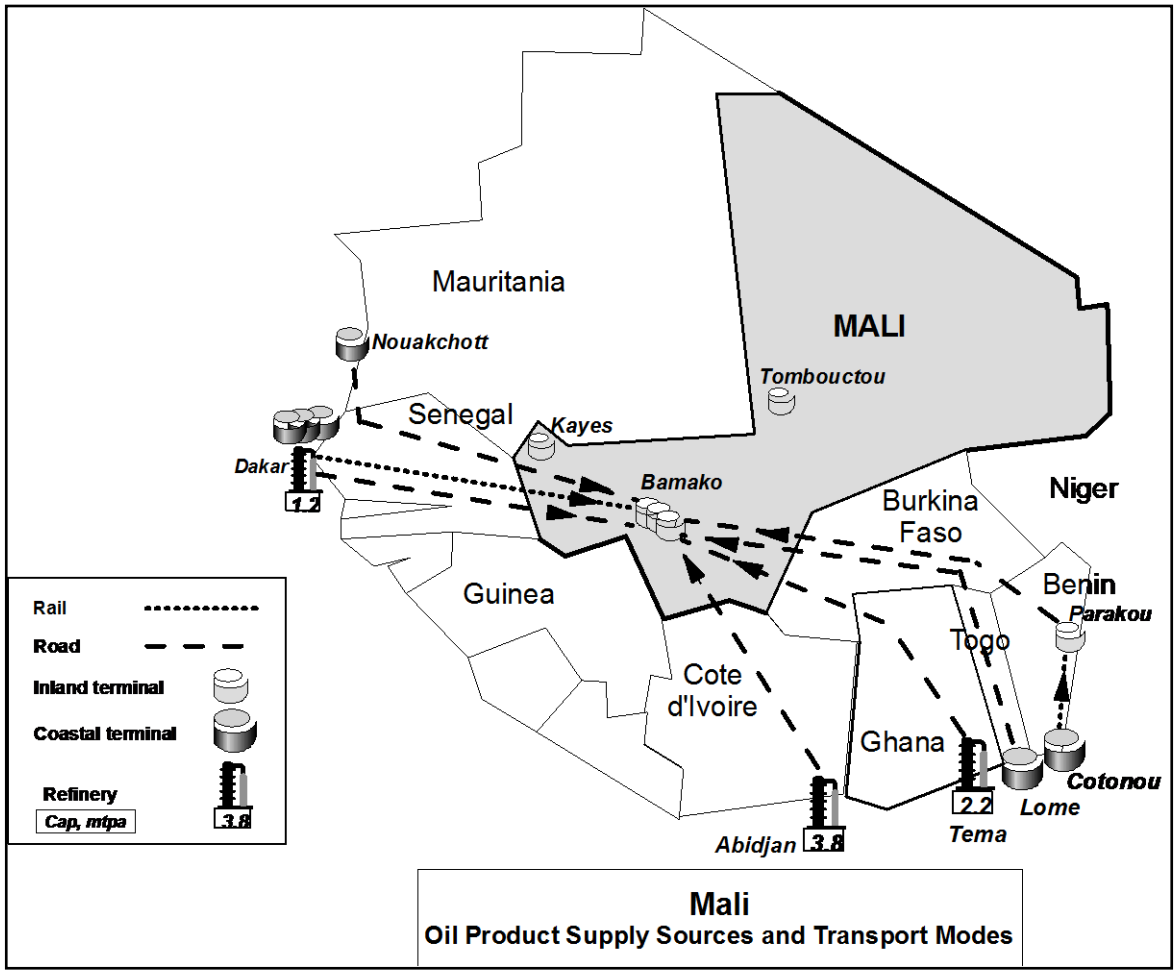
As shown in Table A6.4 there are 5 land-based storage depots in Mali with a total of 48 406 m^3 of capacity. The Bamako depots are owned and operated by multinational Star, Malian independent Sanké and the Malian state entity ONAP. It has been reported that the latter is slated to be put out to the private sector on a concession basis.

Figure A6.1 is a schematic map showing supply sources and transport modes for Mali:

Table A6.4: Mali Oil Product Depots

Name/Ownership	Location	Capacity, m^3
Star Oil	Bamako	16,606
Sanke	Bamako	14,600
ONAP	Bamako	10,000
Sub-Total	**Bamako**	**41,206**
ex-PETROSTOCK	Kayes	7,200
TOTALMali	Tombouctou	1,720
Country Total		**48,406**

Figure A6.1: Mali Oil Product Supply Sources and Transport Modes



2.3 Railway Dakar – Bamako

The 1250 km railway line between Dakar and Bamako is owned by the governments of Senegal and Mali. The old Dakar-Niger railway was run by state companies, *Société Nationale des Chemins de Fer du Sénégal (SNCS) and Chemins de Fer du Mali (RCFM)* respectively until the award to a privately run concession-holder in 2003 which evolved into the consortium now running it *TRANSRAIL SA.*

In terms of general performance of the concession-holder, there has been impatience at the slow pace of rehabilitation and the overall visible results of the concession, for example the amount of new infrastructure built or the extent of rehabilitation of existing infrastructure. Meanwhile, governments and political leaders face pressure from the public for improved passenger services. This poor general performance has a particularly adverse impact on landlocked Mali

In terms of specialized carriage of petroleum products the performance has been even more negative. According to the management of TRANSRAIL there is little incentive for them to make provisions for this business including necessary investments. There is no priority given in Mali to rail transport of oil products. The negative factors for the prospects of rail transport are summarized as follows:

- The tankwagons are left standing for weeks at a time at the unloading depots, leading to theft and product deterioration; as a result the "non-technical losses" are enormous on shipments, deterring any importers that might be otherwise favorable to rail and encouraging them to use road transport.
- Most of the Mali importers are also in the trucking business[14]. They are naturally going to use the trucking option.
- The road from Dakar to Mali is now a feasible route for oil product supply. That was not the case years ago when the road was in bad condition and rail was the only realistic option for Dakar-Bamako shipments
- The ONAP-controlled pricing and taxation system of equalizing prices in Bamako by differential taxation on the different supply routes imposes higher taxes on the cheapest sources/routes (see below).

The carriage of oil products has declined enormously. In 2008 it amounted to 13,000 tonnes. This represented 5% of total oil imports from Dakar and 2% of total imports from all sources.

The current tariff for oil products is 40 F CFA/liter for the Dakar-Bamako haul.

3. Market

Table A6.5 summarizes the evolution in the Mali domestic market for oil products for the period 2003-2007. The total demand in 2007 was 745 000 m^3 up from 556 000 in 2003. This represents an annual compound growth rate of 7.6% over the period. The gasoil growth has been particularly strong at 17.3%, almost doubling its consumption over the period. Gasoline consumption growth at 7% p.a. over the period has also been strong.

Table A6.5: Historical Demand for Petroleum Products in Mali, 10^3 m^3

White Products	2003	2004	2005	2006	2007	%p.a. growth
Total Gasoline	123	134	135	133	161	*7.0%*
Kerosene	35	43	38	39	22	*-11.3%*
Jet	25	24	29	25	28	*3.1%*
Gasoil (autodiesel)	249	277	409	475	473	*17.4%*
Sub-total WP	**432**	**478**	**612**	**672**	**684**	***12.2%***
Black Products						
Diesel Distillate Oil (DDO)	124	135	45	39	59	*-16.9%*
Fuel Oil 180 Cst	0	0	1	2	2	*104.8%*
Sub-total BP	**124**	**136**	**46**	**41**	**61**	***-16.3%***
GRAND TOTAL	**556**	**614**	**657**	**712**	**745**	***7.6%***

[14] This has been a well-known fact for years by the Consultant and was confirmed with both ONAP and the OMCs directly during the January. 2009 visit; it is neither controversial, confidential nor illegal.

4. Pricing & Taxation

In *Mali* price setting is, in principle, deregulated, with the OMCs free to set their prices at the pumps. In practice, the GOM has set up a system of indicative ceiling prices at the pump for gasoline, kerosene and gasoil, which operators are forced to take literally, whereas the prices for DDO and fuel oil are truly free.

The system of indicative prices was introduced by a protocol signed in January 1997 between the government of Mali, the Chambre de Commerce et d'Industries du Mali (CCIM) and the chairman of the Groupement Professionnel des Pétroliers (GPP). Every quarter, a set of reference price structures for each of four different supply routes is calculated for petroleum procurement to Mali. Reference distribution margins for the operators for each product are agreed upon through consensus, whereafter the indicative pump price is defined. In order to protect the consumer against price fluctuations, the price structure for the cost of distribution is only changed when the cost for individual components in the structure changes by more than 20 percent. This implies that prices must operate within a "snake framework" with revisions only triggered by deviations beyond the upper and lower bounds.

ONAP now prepares price structures monthly for each of the six supply sources that are now in play. The costs at source and the transport costs to Bamako differ for each source. ONAP calculates a composite supply cost and total tax rate for all sources and then differentiates the taxation so that all sources are able to supply at the prescribed pump price. This "equalization" of supply costs, including tax, means that the cheapest sources are taxed more heavily than the more expensive sources. This eliminates any incentive to supply from the cheapest source and effectively negates one of the key objectives of supply liberalization – to achieve the least cost supply for Mali.

Note on Gasoil Demand Pattern

1. Generic - in Developing Countries

Gasoil is the most heterogeneous oil product in terms of sectoral demand. Unlike gasoline, a product dispensed at the pumps solely for automotive use, it is a major product sold in bulk for use in power generation, general industry, mining and agriculture, in addition to automotive use. These bulk uses, particularly in small economies, can be quite "lumpy" year-to year. Power generation is affected by availability of other generation options such as hydraulic and attendant water levels. Industries are affected by startups and shutdowns of plant.

2. Specific to Mali

Table 5.5 demands are official ONAP statistics. It can be noted that the two fuels used in power generation in Mali, gasoil and DDO, are counter-trending 2004-2005. Gasoil increases, DDO decreases by almost the same volume. This would suggest that gasoil was replacing DDO in power generation in 2005 and continuing through 2006 and 2007.

Gold mining in Mali has increased dramatically, to more than 50 tonnes in 2007 from less than half a tonne produced annually at the end of the 1980s. Gasoil use in this industry would have grown commensurately

More data would have to be gathered in order to confirm these

ONAP rationalizes this approach by citing it as a means of ensuring security of supply to the country through the diversification of supply. It recognizes that this comes at a significant macro cost to the country but insists that this is the cost that Mali must pay for diversity and hence security of supply.

Table A6.6 is the estimated price structure for December 2008 using a weighted average of all six supply points based on year 2008 volumes. The ONAP weighting calculation is not transparent

Table A6.6: Mali Retail Price Structure, FCFA/litre
Based on Weighted Average of Six Supply Points Effective December, 2008

	Gasoline Super	Kerosene	Gasoil
Price ex-Coastal Supplier	188	276	297
Transport & related Costs to Bamako	73	68	69
Total Taxes, Government take	344	100	149
Overall Margin, incl loc transp, distrib, retail	60	26	40
Pump Price	**665**	**470**	**555**

and readily available so this is the consultant's estimate.

Table A6.7 illustrates the effect of the supply cost equalization. The comparison of Abidjan and Lomé is made in terms of percent distribution of weighted average of the price structures of gasoline, kerosene and gasoil using 2007 product demands as weighting factor. As can be seen the lowest cost supply from Abidjan bears a tax equivalent to 51% of pump price while the highest cost supply from Lomé has a much lower tax burden of 39% of pump price.

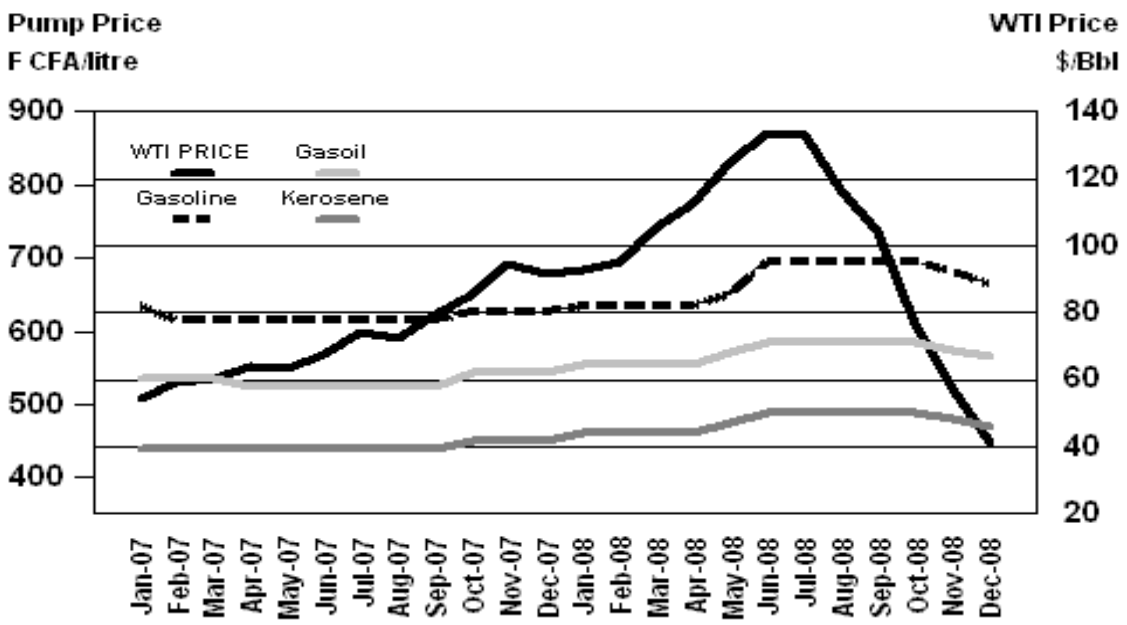
Table A6.7: Mali Retail Price Structure, % Distribution of Main Elements
Comparison of Abidjan and Lomé Supply Sources/Routes
Weighted Average of 2007 Product Demands Effective January, 2009

	Abidjan	Lomé
Price ex-Coastal Supplier	30%	40%
Transport & related Costs to Bamako	11%	14%
Total Taxes, Government take	51%	39%
Overall Margin, incl loc storage, transp, distrib, retail	8%	8%
Pump Price	**100%**	**100%**

In terms of price differentiation by population center or region of the country, it appears that indicative prices are maintained as pump prices are pretty well the same throughout the country. Effectively the importer/distributors are doing their own equalization within their accounts.

The graph, Figure A6.2, provides an illustration of the evolution in Mali's pump prices compared with the WTI reference crude price over the 2007-2008 period of extreme price escalation.

Figure A6.2: Mali Oil Product Pump Prices vs
WTI Reference Crude Price, 2007-2008 Monthly



In principle, the pump prices are calculated monthly and indicative prices are adjusted based on actual supply prices at the coastal sources. In practice, during the 2007-2008 extreme run-up in international prices, the pump prices were maintained at a level lower than actual costs and usual taxation through a continuous and eventually drastic reduction in taxes destined to the Treasury. This reduction and eventual elimination of taxes was done as a means of stabilizing pump prices to final consumers. In other words the usual adjustment process was abandoned due to political intervention in order to cushion the public from the full effects of the price increases. Since petroleum product taxes are a major source of revenue to a country like Mali this had a drastic impact on 2008 government revenues.

Fortunately for the government international prices eased in the latter half of 2008 and they were able to re-establish usual tax rates and even increase rates above pre-escalation levels in order to recover lost revenue. It is not certain how well this stabilization financial exercise has been formally accounted for within the state budgeting.

The graphs included as Figures A6.3, A6.4 and A6.5 are plots of the pump price for each key product vs. the respective Spot FOB Med reference prices for the same period both expressed in the same currency units. The differential between pump price and Spot price is included in the same plot.

Figure A6.3: Mali Gasoline Pump Price vs Spot Price FOB MED & Pump –Spot Differential, 2007-2008 Monthly

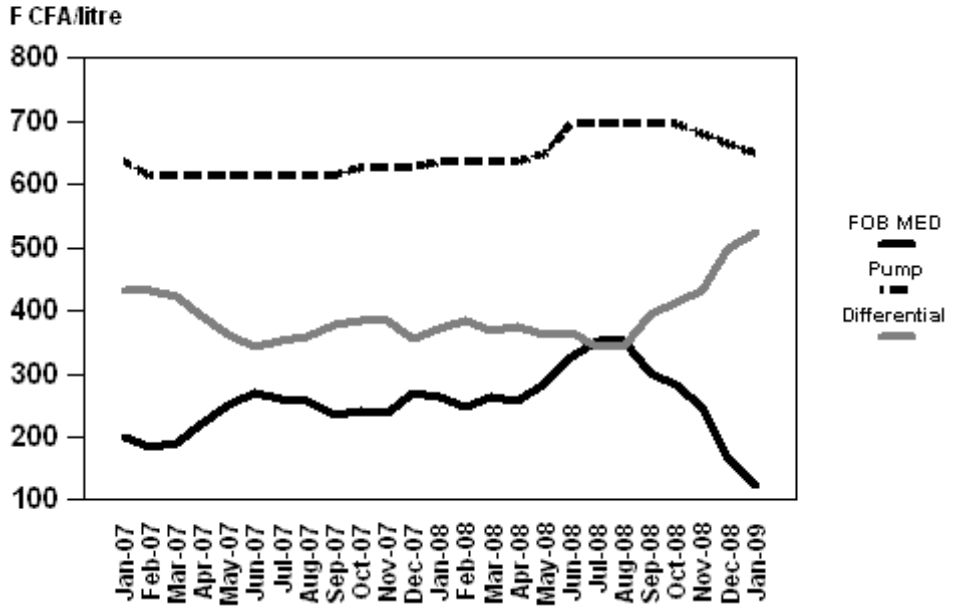


Figure A6.4: Mali Kerosene Pump Price vs Spot Price FOB MED & Pump – Spot Differential, 2007-2008 Monthly

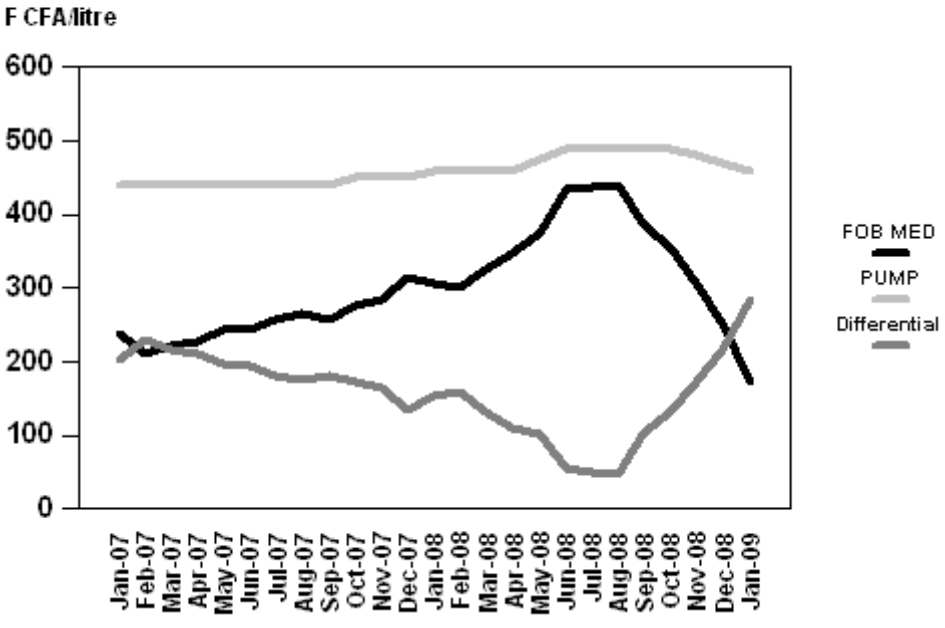
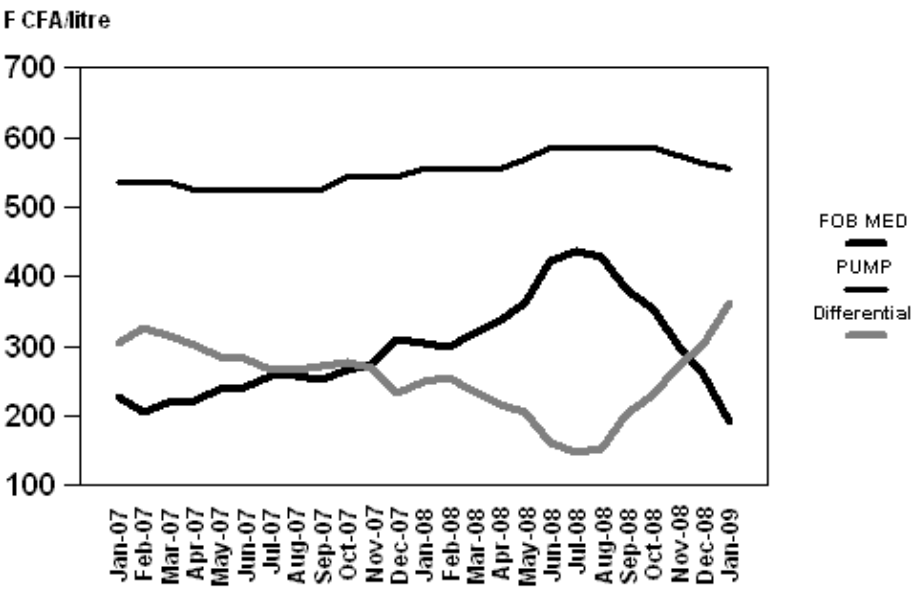


Figure A6.5: Mali Gasoil Pump Price vs Spot Price FOB MED & Pump – Sport Differential, 2007-2008 Monthly



5. Other Sector Issues & Findings

1) Price Stabilization: It is understandable that governments wish to protect consumers somehow from the severe impacts of international price escalations. The approach to stabilization should be clearly established beforehand. The rules should be laid out in terms of government revenues to be maintained and at what point price increases are triggered in order to recover lost revenues. This would avoid ad-hoc reactions and last minute panic catch-ups in order recover revenues.

2) Supply Cost Equalization: As a minimum ONAP should be charged with calculating the total macroeconomic cost to the country of maintaining this policy. The cost to the country of maintaining security of supply through diversification of supply sources will then have been evaluated and made transparent for purposes of future policy formulation.

3) Valuation of Potential Cost Efficiency: For purposes of cost efficiency valuation it has been assumed that true liberalization of bulk supply is instituted without any supply cost equalization. The valuation of the resulting efficiency assumes that 80% of the supply will be obtained from the cheapest source and 20% from the present mix of supply points. This would result in a reduction 42 F CFA/liter in the pump prices per product on average. This amounts to a reduction of 7.5% in average pump prices over the 2007-2008 period. The annual amount equates to 35.7 billion F CFA or some US$ 76 million at current exchange rates.

4) Dakar –Bamako Railway – *TRANSRAIL* : With the import of oil products into Mali dominated by individuals and companies who are primarily involved in trucking in addition to retail distribution, it appears like the TRANSRAIL option for shipping from Dakar is

moribund. This is a shame because based on previous studies, using benchmark-established tariffs for the railway vs economic costs for trucking (5 year life cycle tariff calculation) and assuming the same product costs at each coastal location, it has been shown that the rail option is the most economic supply mode to 60 to 70% of the Mali market.

Annex 7 Niger

1. Legal, Regulatory, Institutional framework – Sector Organization

1.1. Introduction

The Ministry principally responsible for oversight of the oil products sector in Niger is the Ministry of Commerce, Industry and Normalization. The Ministry of Mines and Energy also plays a role in oversight regarding technical issues such as product quality, specifications and the mechanical integrity and safety of installations. The Ministry of Finance also has a specialized role through its Customs division which has a Directorate engaged solely with hydrocarbons.

1.2 Legal/Regulatory Framework

The regulatory framework for the sector includes the following texts :

- Ordonnance n° 77-01 20th January 1977 creating the State Oil Company, SONIDEP
- Ordonnance n° 92-025 7th July 1992 concerning regulation of petroleum product prices and competition
- Ordonnance n° 2001-004 26th July 2001 modifying the fiscal regime applicable to petroleum products.
- Ordonnance n° 2001-128 26th July 2001 fixing the modalities for adjustment of petroleum product prices.

In addition to these texts which have to do with the creation of the State oil company and with petroleum product pricing there are a few dated texts from the 60s and 70s which deal with hazardous products and hazardous installations.

Table A7.1: Niger Downstream Oil Sector Legal, Regulatory & Institutional Framework

Population, 2007, millions	14.2
GDP per capita, Atlas *(WB WDI 10 sep 08)*	$294
Percent of oil products imported	100%
Degree of socio-political freedom *(Freedom House 2009)*	Partly Free
Government Participation in:	
Refining	n/a
Importing Oil Products	100%
Logistics (Storage) Infrastructure	100%
Marketing Oil Products	None
Contingency/Strategic Stocks	Yes
Existence of Comprehensive, Modern Downstream Legislation; COMMENTS	NO, relates mainly to price, licensing and SONIDEP attributions
Rating 1-10	2
Existence of centralized, specialized Downstream Regulatory Institution (s); COMMENTS	NO- Old French model- Commerce for licensing and price, Mines/ En in principle for technical issues
Rating 1-10	2
Oversight and Enforcement	Weak

1.3. Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled

SONIDEP (Société Nigérienne de Dépôt d'Essence et de Pétrole)

SONIDEP is a State Corporation with a legal monopoly over the importation and storage of petroleum products. It reports to the Ministry of Commerce, Industry and Normalization. In addition to its role as the sole (formal) importer of petroleum products into Niger it owns and

operates six oil product storage depots situated strategically throughout the country. In addition it has the following responsibilities:

- The overall security of supply of oil products in Niger
- The maintenance and management of security stocks

Private Sector

There are a total of 17 distributing companies of which two affiliates of multinationals – Total and Libya Oil and a major local independent, SONIHY. The remaining 14 are small Nigerien independents.

Table A7.2 is a summary of data that was available for the share of activity by each of the top three distributors in 2007. Applying structural criteria of industry concentration from the table as follows:

- Market Leader 48%,
- Top Four (approx) 83%
- Herfindahl-Hirschman Index (HHI) of 2959

It may be concluded that the Niger oil products distribution industry is highly concentrated with some potential for market domination by a combination of the players.

2.

Table A7.2: Niger Oil Products Distribution, Market Shares, 2007
Total All Products Excluding SONDIEP Direct Sales to NIGELEC and Administration

	m^3	Share	Cumulative Share	H-H Index
TOTAL Niger	82,627	48%	48%	2,302
Libya Oil	38,883	23%	71%	510
SONIHY	15,215	9%	79%	78
14 independents	35,501	21%	100%	70
Total	**172,226**	**100%**		**2,959**

Supply, Procurement Arrangements and Infrastructure

2.1. Supply, Procurement Sources and Arrangements

SONIDEP procures its product at present from three main sources based on the negotiation of supply contracts from a limited selection of traders ("consultations restreintes"). Table A7.3 provides a breakdown of supply quantities for 2008 by source and by product grade. The transit distances from source to Niamey are shown. Lomé and Tema distances are 100% by road while the distance from Cotonou is partly rail and road via Parakou.

The largest source at 76% of the total is Cotonou, Benin usually through the trader Addax which owns and operates the terminal there. The second largest coastal supply point at 22% is the

Table A7.3: SONIDEP Imports by Source, and Product, tonnes, 2008

Sources	Distance to Niamey, km	Gasoline	Gasoil	Jet	Fuel Oil	Total	Proportion by Source
Cotonou, Benin	1,060	36,500	79,500	0	7,000	**123,000**	**76%**
Lomé, Togo	1,240	13,374	7,831	14,657	0	**35,862**	**22%**
Tema, Ghana	1,370	0	3,719	0	0	**3,719**	**2%**
Total		**49,874**	**91,050**	**14,657**	**7,000**	**162,581**	**100%**

STSL terminal in Lomé Togo from a variety of traders/suppliers. There is also a limited supply, 2%, from the Tema refinery, Ghana.

Figure A7.1 is a schematic map showing supply sources and transport modes for Mali.

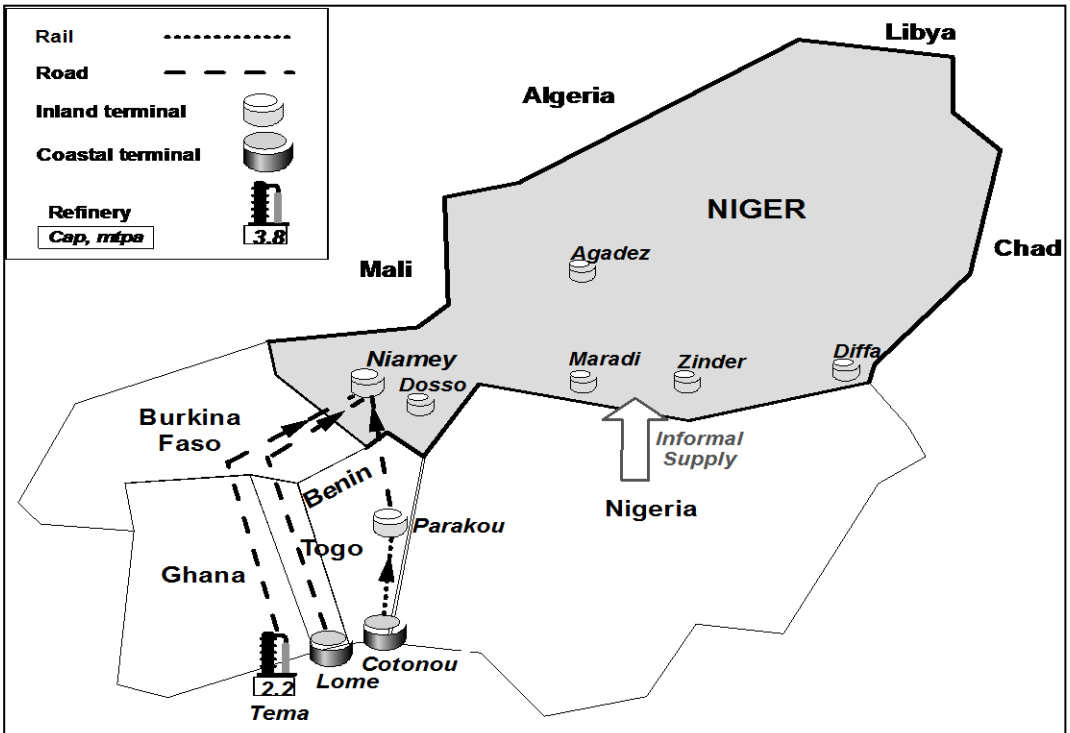


Figure A12.1: Niger
Oil Product Supply Sources and Transport Modes

2.2. Oil Product Storage

Table A7.4 summarizes the oil product storage infrastructure in Niger by product grade and depot location. There is a total capacity of 39,132 m^3 in six depots located strategically throughout Niger. The storage is wholly owned and operated by SONIDEP.

3. Market

Table A7.5 summarizes the evolution in the Niger domestic market for oil products for the period 2004-2007. The total demand in 2007 was 745,000 m^3 up from 556,000 m^3 in 2003. This

Table A7.4: NIGER – SOINDEP Oil Product Depots

Location	Distance from Niamey, km	Capacity m^3				
		Gasoline Super	Gasoil	Kerosene	Fuel oil	TOTAL
Niamey (Sorey)	0	8,328	14,726	628	1,104	24,786
Dosso	129	2,440	2,840	100	0	5,380
Agadez	954	1,120	2,840	100	0	4,060
Maradi	657	223	323	50	0	596
Zinder	907	1,070	2,040	100	0	3,210
Diffa	1,307	100	900	100	0	1,100
TOTAL		**13,281**	**23,669**	**1,078**	**1,104**	**39,132**

represents an annual compound growth rate of 1.7% over the period. This is the lowest growth rate of the 5 regional countries. It would have to be analyzed against measures of total economic growth but one possible reason is an upsurge in informal fraudulent supplies from Nigeria.[15] In other words total formal supply figures (shown herein) are possibly augmented by a stronger

Table A7.5: Historical Demand for Petroleum Products in Niger, 10^3 m^3

White Products	2004	2005	2006	2007	%p.a. growth
Total Gasoline	76	71	68	77	*0.5%*
Kerosene	14	8	6	5	*-27.9%*
Jet	14	16	12	14	*0.1%*
Gasoil (autodiesel)	65	68	67	85	*9.1%*
Sub-total WP	**169**	**163**	**152**	**181**	***2.3%***
Black Products					
Diesel Distillate Oil (DDO)	15	15	10	13	*-5.2%*
Fuel Oil 180 Cst	8	8	9	12	*15.0%*
Sub-total BP	**15**	**15**	**10**	**13**	***-5.2%***
GRAND TOTAL	**185**	**178**	**162**	**194**	***1.7%***

[15] INTERNET article « Afrique en Ligne » Niamey - 24/05/2008 « *Niger: Baisse des ventes de la SONIDEP pour cause de fraude* **…** La société nigérienne des produits pétroliers (SONIDEP) connaît en ce moment une baisse de ses ventes oscillant entre 14 et 20% du fait de l'intensification de la fraude, a annoncé samedi son directeur général, Amadou Dioffo …

English Translation : *« Niger. Decrease in SONIDEP's Sales caused by fraud »* … SONIDEP experiences at this moment a decrease in its sales ranging between 14 and 20% due to the intensification of fraud the Director-General, Amadou Dioffo has announced …

There are many other INTERNET articles on the same theme and some of the estimates of the extent of fraud are higher.

growing informal supply. Informal supply has been quoted as accounting for as much as 20% to 30% of the total Niger consumption.

4. Pricing & Taxation

The petroleum product prices to final consumers in Niger are controlled under a formal, import parity price (IPP) structure.

In accord with a classic IPP structure, the theoretical cost build-up begins with a hypothetical product sourcing assumption or FOB reference price for each product In this case they use an average of Platts FOB and CIF Mediterranean for the appropriate product grade. To the FOB price assumption is added a flat "prime" or premium to cover freight costs and associated trader's margin in order to deliver to a coastal depot pertinent to Niger supply. This results in a CIF cost at coastal depot to which is added freight-related charges such as cargo loss and insurance, port charges and unloading costs. The sum of these factors results in a hypothetical total landed cost (CIF) for each product at the coastal depot.

To this is added the coastal depot throughput fee and related charges, the transport/transit charges to ship to the border and all customs charges and taxes to arrive at a CIF price at the border, including all taxes. To this is added the interior transport cost to SONIDEP depots and SONIDEP's total margin elements (importer/depot margin) to arrive at a price ex-depot SONIDEP for each product. To this is added the margins for the distributor and the retailer to arrive at a pump price for each product.

Table A7.6 is a simplified summary of the price structure that was applicable in December 2008. The long-distance transport elements have been combined in one item and the ex-depot price is not shown explicitly.

Pump prices are maintained the same throughout the country effectively through an equalization by SONIDEP within its accounts. Since it has depots distributed throughout the country it simply maintains the same ex-depot price for each product.

Table A7.6: Niger Retail Price Structure, FCFA/litre
Based on Equalized Transport to all Interior Depots
Effective December, 2008

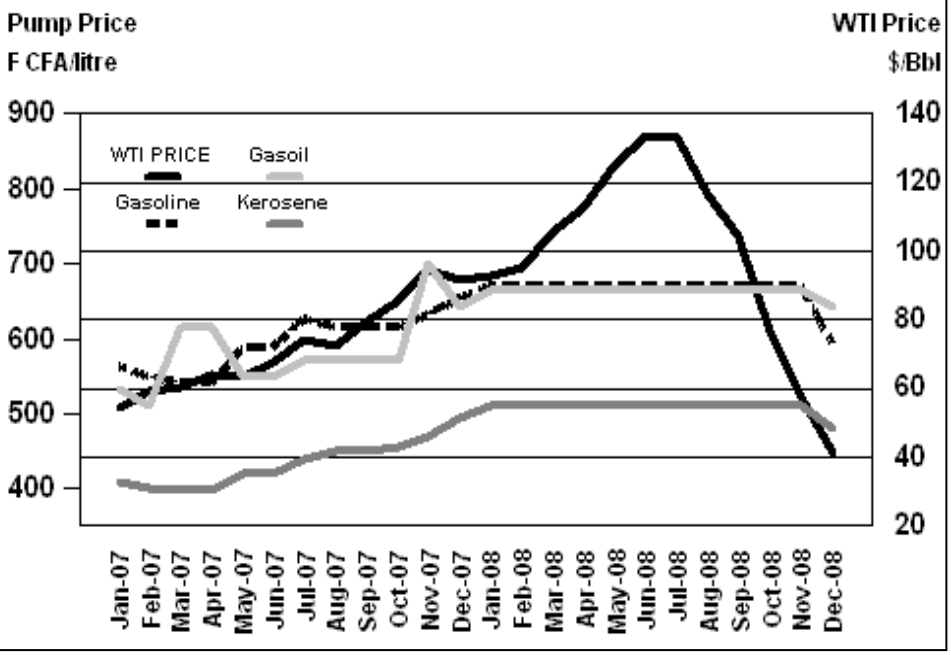
	Gasoline Super	Kerosene	Gasoil
CIF Price Coastal Depot	225.31	334.69	333.04
Coastal Depot throughput fee & related	11.04	11.31	10.79
Transport & Transit Costs to Niger Depots	60.74	60.19	62.96
Total taxes, government take	218.06	5.46	164.78
Importer/Depot Margin	34.78	32.60	35.68
Distributors' Margin	28.57	22.25	22.25
Retail Margin	13.50	13.50	13.50
Pump Price	**592.00**	**480.00**	**643.00**

This IPP structure is calculated monthly and, in principle should result in a monthly adjustment in accordance with the established formula. In practice during the 2007-2008 extreme run-up in international prices, SONIDEP maintained this value at a level lower than actual costs and taxes as a means of stabilizing the ex-depot prices and attendant pump prices to final consumers. In other words the automatic adjustment process was abandoned due to political intervention to cushion the public from the full effects of the price increases. It was the customs and taxation which acted as the absorption modality for this "stabilization". The collection was drastically reduced during 2008. With the decline in international prices of 2nd half 2008, the level of the pump prices have been moderated somewhat but maintained above actual costs and taxes. They are now in "recovery mode" regarding the accounts of customs and taxation. According to SONIDEP rigorous accounts of the loss and subsequent recovery of customs and taxation revenue are being kept.

Table A7.6 shows that Niger, in common with the French African countries and most European countries, taxes gasoil at a rate lower than gasoline. Due to extremely high international prices for gasoil in relation to gasoline this did not result in a lower pump price for gasoil in December 2008 but has done so over most periods in the past.

The graph, Figure A7.2, provides an illustration of the evolution in Niger's pump prices compared with the WTI reference crude price over this 2007-2008 period of extreme price escalation. It also shows in rough terms, that prices were kept below cost-recovery levels during the peaking period and are now above such levels while customs and taxation rehabilitates their accounts. It also shows earlier pump prices for gasoline and gasoil, where, except for brief winter market spikes in international gasoil prices, gasoline has been higher than gasoil at the pump.

Figure A7.2: Niger Oil Product Pump Prices vs WTI Reference Crude Price, 2007 – 2008 Monthly



The graphs included as Figures A7.3, A7.4 and A7.5 are plots of the pump price for each key product vs. the respective Spot FOB Med reference prices for the same period both expressed in the same currency units. The differential between pump price and Spot price is included in the same plot.

Figure A7.3: Niger Gasoiline Pump Price vs Spot Price FOB MED & Pump-Spot Differential, 2007-2008 Monthly

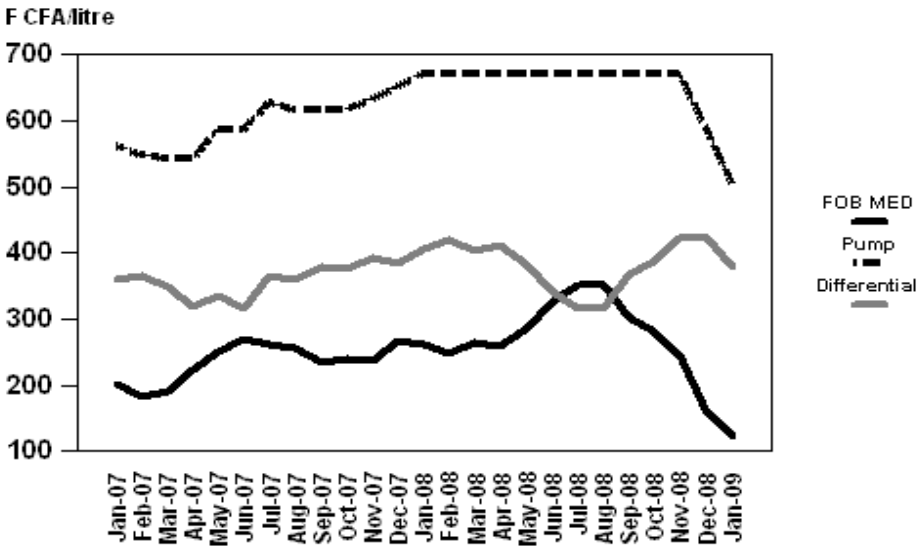


Figure A7.4: Niger Kerosene Pump Price Vs Spot Price FOB MED & Pump – Spot Differential 2007 – 2008 Monthly

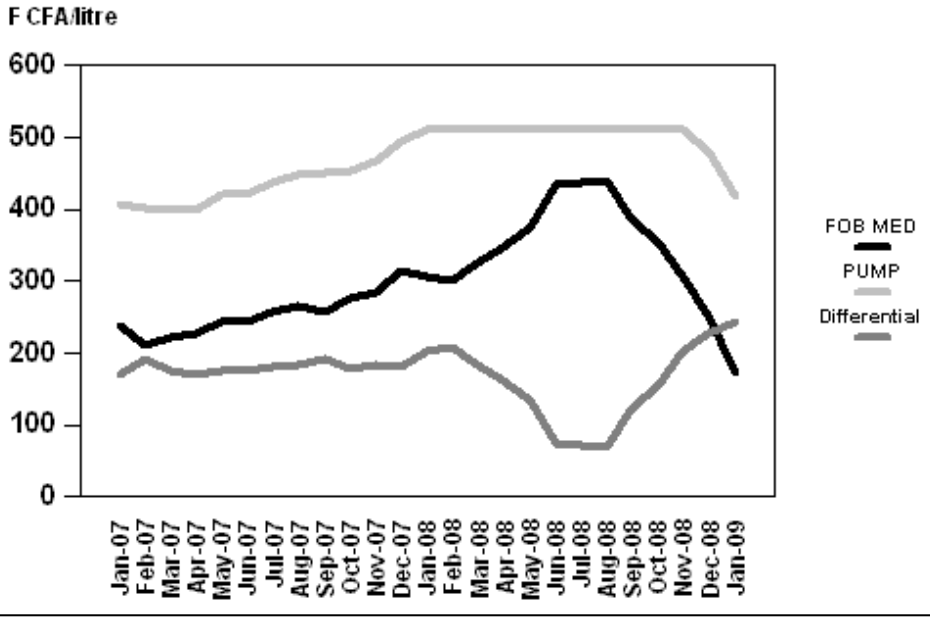
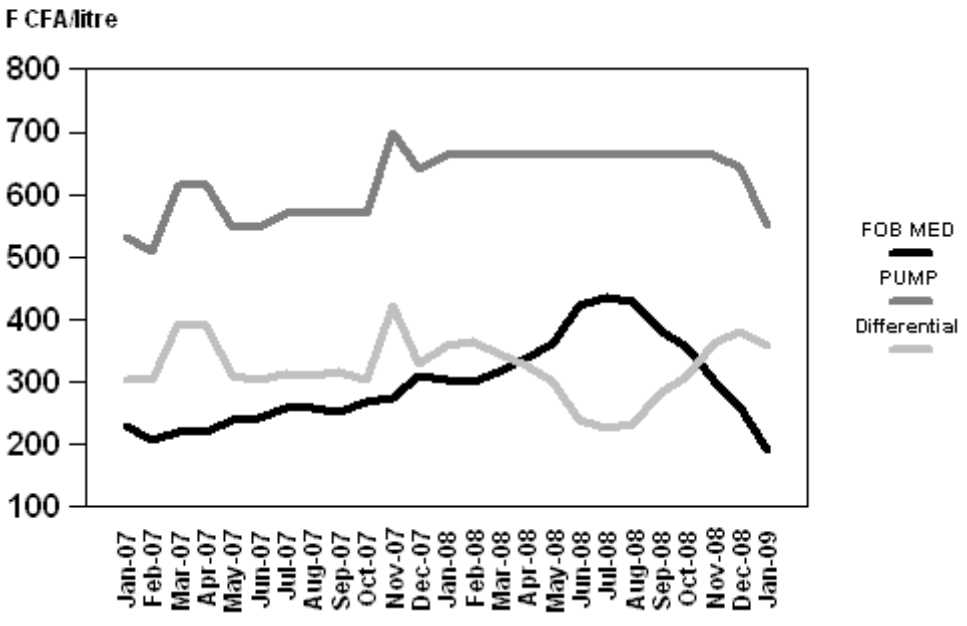


Figure A7.5: Niger Gasoil Pump Price Vs Spot Price FOB MED & Pump – Spot Differential 2007 - 2008 Monthly



5. Other Sector Issues & Findings

1) Price Stabilization: Niger has engaged in stabilizing its pump price during the severe escalation of international prices during 2007-2008. It used an ad-hoc reduction in oil product taxation as a means of achieving this, followed by an increase above "normal" taxation, when international prices eased, in order to recover revenues to the Treasury. The approach to stabilization should be clearly established beforehand. The rules should be laid out in terms of government revenues to be maintained and at what point price increases are triggered in order to recover lost revenues. This would avoid ad-hoc reactions and last minute panic catch-ups in order recover revenues.

2) Fraudulent Imports of Oil Products: There are significant volumes of smuggled oil products arriving in Niger, primarily from Nigeria, but also volumes from Libya and Algeria. It has been estimated[16] that this "informal" supply could amount to some 20 to 30% of Niger's total oil products consumption. The two stakeholders who lose revenue with this fraud, SONIDEP and Customs, are aware of this and they are doing their best to combat it. It is not certain whether they have considered outsourcing the surveillance to a private inspection firm. This might help but the ultimate problem lies with enforcement and policing. They are faced with geography – a 1500 km border with Nigeria and very few officials to police it.

3) Valuation of Potential Cost Efficiency: The State bulk supply and storage company, SONIDEP, has not been benchmarked in the past for procurement performance depot

[16] Viz. footnote 15.

management and overall administration efficiency. It is felt that an audit/benchmarking exercise on the business would identify efficiency programs and investments which could lead to savings. For purposes of cost efficiency valuation it has been assumed that a 10% reduction in SONIDEP's total costs and hence gross margin requirements could be achieved. With a gross margin of 34 F CFA/liter on average in the price structure this would result in a 3.4 F CFA/liter reduction in the pump prices per product. This amounts to a reduction of 0.5% in average pump prices over the 2007-2008 period. The annual amount equates to 0.7 billion F CFA or some US$ 1.5 million at current exchange rates.

Annex 8 Senegal

1. Legal, Regulatory, Institutional framework – Sector Organization

1.1. Introduction

The Ministry responsible for oversight of the oil products sector in Senegal is the Ministry of Energy. Within the Ministry, the Energy Directorate is the key policy advisory body for the entire energy sector including the downstream petroleum sector.

An important institution created under the 1998 reform legislation is the *Comité National des Hydrocarbures.* It reports to the Ministry and is primarily a consultative body providing input to Ministry decision-making pertinent to the sector. Its most important operating domains are in oil product pricing and in the granting and oversight of operator licenses. An important role is also in the formulation of recommendations for the modification of existing legislation or in the preparation of new legislative texts.

Table A8.1: Senegal Downstream Oil Sector Legal, Regulatory & Institutional Framework

Population, 2007, millions	12.4
GDP per capita, Atlas *(WB WDI 10 sep 08)*	$898
Percent of oil products imported	60%
Degree of socio-political freedom *(Freedom House 2009)*	Partly Free
Government Participation in:	
Refining	65%
Importing Oil Products	0%
Logistics (Storage) Infrastructure	Limited
Marketing Oil Products	None
Contingency/Strategic Stocks	None
Existence of Comprehensive, Modern Downstream Legislation; COMMENTS	YES, Fairly comprehensive, recent texts
Rating 1-10	8
Existence of centralized, specialized Downstream Regulatory Institution (s); COMMENTS	YES, but actual regulatory function appears weak
Rating 1-10	7
Oversight and Enforcement	Moderate

8.1.2 Legal/Regulatory Framework

Senegal has a fairly comprehensive regulatory framework for the downstream petroleum sector. Most of the original texts were prepared as part of the reform/restructuring process of 1998 and have been kept reasonably up to date with modifications since.

A selection of the key texts is listed as follows:

- Law N° 98-31 14th April 1998 Relative to the Activities of Importation, Refining, Storage and Transport of Hydrocarbons
- Decree N° 98-338 21st April 1998 Fixing the Conditions for Exercising the Activities of Importation, Refining, Storage and Transport of Hydrocarbons
- Decree N° 98-337 21st April 1998 Fixing the Operating Rules for the *Comité National Des Hydrocarbures*
- Decree No N° 2006-952 26th September 2006 Abrogating and Replacing Decree N° 98-342 21st April 1998 Fixing the Modalities for Determination of the Price of Refined Hydrocarbons
- Decree N° 98-339 21st April 1998 Fixing the Modalities for Calculating the Storage Throughput Fees
- Decree N° 98-340 21st April 1998 Fixing the Modalities for Constituting Hydrocarbons Security Stocks

- Decree2003-415, 4 June, 2003 repealing and replacing the decree 2002-03 of 10 January 2002 Fixing the Specifications of Refined Hydrocarbons[17]

Without examining the content, it can be seen from the listing that the 1998 Law and its Regulations are fairly complete in coverage of the principal regulatory areas of the sector

1.3 Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled Enterprises

SAR (Société Africaine de Raffinage)

The SAR refining facility is a simple skimming refinery of 1.2 million tonnes per year of crude capacity. It is located in Mbao in the outskirts of Dakar, some 15 km from the city center. It is owned 65.4% by the State and 34.6% by Total. More detail of its capacity, configuration and operations is provided under item 2 below.

Private Sector

Storage

There are a total of 8 privately owned oil product depots in and around Dakar. The details of ownership, capacity and configuration are provided under item 2 below.

Distribution

There are five affiliates of multinationals - Total, Shell, Libya Oil, Oryx and Star Oil as well as eight local "independent" oil product distributors in Senegal.

There are two industry professional groupings:

- GPP- Groupement Professionelle de L'Industrie du Pétrole whose members are three of the five multinationals: Total, Shell and Libya Oil.
- ASPP – Association Senegalaise des Professionelles du Pétrole ; the members are the eight local "independents" plus the multinational Oryx, nine in all.

Table A8.2 is a summary of the 2008 market shares for the total network and consumer sales of white products.

Applying structural criteria of industry concentration from the table as follows:

- Market Leader 40%,
- Top Four 84%

Table A8.2: Senegal – Market Shares Network & Consumer Sales of Clean Products, Jan –Aug, 2008

Company	m^3	Share	Cumulative Share	H-H Index
Total	219,190	39.7%	39.7%	1,576
Shell	138,192	25.0%	64.7%	627
Libya Oil	65,089	11.8%	76.5%	139
Elton	41,058	7.4%	84.0%	55
Oryx	30,496	5.5%	89.5%	31
Star oil	13,519	2.4%	91.9%	6
Diprom	12,520	2.3%	94.2%	5
Pétrodis	6,925	1.3%	95.5%	2
SGF	6,681	1.2%	96.7%	1
API	6,405	1.2%	97.8%	1
Ciel Oil	5,689	1.0%	98.9%	1
MKA	5,073	0.9%	99.8%	1
Thome Oil	1,212	0.2%	100.0%	0
TOTAL	**552,048**	**100.0%**		**2,445**

[17] After this Decree there have been further, unofficial unformalized changes in product specifications: Since July, 2005 Gasoline super and regular are 0.013 g/liter maximum lead (unleaded) and super is minimum 91 RON. These are SAR specifications but no decree has been issued.

- Herfindahl-Hirschman Index (HHI) of 2445

It may be concluded that the Senegal oil products market is of medium-high concentration with some potential for market domination by a combination of the players. In fact, the "Independents" have complained that the market leader, *Total*, exploits its dominant position in the sector - refining (35% of SAR), storage/receiving/expediting (largest operator by capacity and control of logistics) and distribution (40% of the market) to engage in unfair competition. They say this manifests itself particularly in its domination of importation of SAR's deficit finished products and also in its dominant position as importer/re-exporter to landlocked Mali.

2. Supply, Procurement Arrangements and Infrastructure

2.1. Refining and Product Supply

Senegal has a simple, skimming refinery located near Dakar. The crude oil capacity is 1.2 million tonnes per year or 25,000 barrels per day. Other than a reformer and some product treatment it has no secondary processing to speak of. It is an old facility, dating from 1963.

It typically runs on a diet of light, sweet Nigerian crudes. The latest grades acquired have been Bonny Light and Erha.

SAR recently came through a period of serious financial difficulties. In the years leading up to March 2006 its product revenues were not covering its crude oil and operating costs. This was a fundamental problem that the import parity price structure was not providing a composite ex-refinery price high enough to cover costs. It ran up an enormous debt to the bank(s) financing its crude supplies. This debt amounted to some 85 billion F CFA (US$ 180 million) by March 2006 and the financing of its crude supply was halted forcing it to close its doors. SAR was essentially insolvent at that point. It stayed out of service for 11 months, until February 2007 when a crude financing arrangement was agreed with BNP Paribas. This agreement entailed the establishment of a fund *(Fonds de sécurisation des importations de produits pétroliers {FSIPP}*) .financed by the product price structure to amortize the debt. The special charges in the price structure amount to 35 F CFA per liter of white product and 25 F CFA per kg of black product.

The debt principal currently stands at 17 billion F CFA. They expect to fully amortize it within a year. Following this, however, SAR will need some form of significant protection to be added on to the IPP price structure in order for it to survive. It has been suggested something akin to the "coefficient of protection" that is in the Côte d'Ivoire structure to protect SIR. The formula application may be similar but the actual coefficient will certainly have to be much larger than the 5% that is now incorporated in the Côte d'Ivoire structure for SIR.

The Nigerian crude is acquired under a State-State arrangement between Senegal and Nigeria. The price is negotiated every three months and the government of Senegal pays the crude bill. SAR then pays the government.

Being a simple refinery without secondary conversion, SAR's product yields do not match the market mix of Senegal. There are significant deficits of distillates – gasoil and jet/kerosene as well as fuel oil. The amount of deficit product is assessed every 15 days by a committee comprising representatives of CNH, SAR and all the licensed importers. The committee then allocates the import entitlement to one or more of the operators. The importers refuse to import under the IPP structure and insist on full recovery of actual costs incurred. In practice, Total

Senegal through Total Trader seems to be dominating the importation of deficit product. There are several reasons for this:

- Total has the wherewithal and expertise, particularly compared to the "Independents", to manage the technical details of, and finance the importation of the appropriately-sized finished product cargoes.
- GPP led by Total, dominates the depot receiving/storage/dispatching facilities again, particularly compared with the purely local "Independents".
- The other two multinational members of the GPP "club", Shell and Libya Oil, seem to be leaving the import to Total by default. Effectively Total dominates GPP in this regard.

2.2. Oil Product Storage

The Dakar depot infrastructure and system of interconnecting lines, owned by multinationals and independents is complex and interdependent; there are a total of 8 depots with some 334 000 m3 of storage capacity for white and black products. Certain depots such as SPP and DOT have truck loading facilities and are the prime installations serving the truck-fed network and consumer markets for gasoline, kerosene and gasoil and jet bridging while others such as Shell Bel Air have no truck loading capability and are used primarily to "park" product for term storage.

Table A8.3: Senegal – Dakar Oil Product Depots
Summary of Capacity by Product Grade, m^3

Depot ID	Gasoline Super	Gasoline Regular	Kerosene/Jet	Gasoil	Ind Diesel	Fuel Oil	White (unspecified)	Black (unspecified)	TOTAL
Land-Based									
SPP	9,184	2,652	14,808	13,009	0	0	0	0	**39,653**
BAE	0	0	14,300	24,900	0	0	0	0	**39,200**
DOT	6,400	4,800	17,800	20,300	3,700	1,300	0	0	**54,300**
SDE	0	0	0	0	0	7,650	0	0	**7,650**
SENSTOCK	0	0	0	0	0	0	24,000	5,000	**29,000**
Sub-Total Land	**15,584**	**7,452**	**46,908**	**58,209**	**3,700**	**8,950**	**24,000**	**5,000**	**169,803**
Port-Based									
SHELL	0	0	0	20,100	2,000	30,800	0	0	**52,900**
SPP	0	0	0	35,420	10,789	16,710	0	0	**62,919**
ORYX	0	0	0	29,500	0	18,500	0	0	**48,000**
Sub-Total Port	**0**	**0**	**0**	**85,020**	**12,789**	**66,010**	**0**	**0**	**163,819**
Total Dakar	**15,584**	**7,452**	**46,908**	**143,229**	**16,489**	**74,960**	**24,000**	**5,000**	**333,622**

Table A8.3 provides a summary of the depot capacities by product grade and depot designation.

Table A8.4 on the following page provides much more detail on the depot ownerships and configuration of interconnections. This chart was originally prepared in 1998 by the consultant as an aid in understanding the constraints and complications of implementing the liberalization and restructuring of the sector. With the aid of officials on the ground during this mission the chart was updated and enhanced to reflect current status.

Figure A8.1 is an adaptation of a satellite map of Dakar and environs showing the location of the various oil product depots as well as SAR refinery.

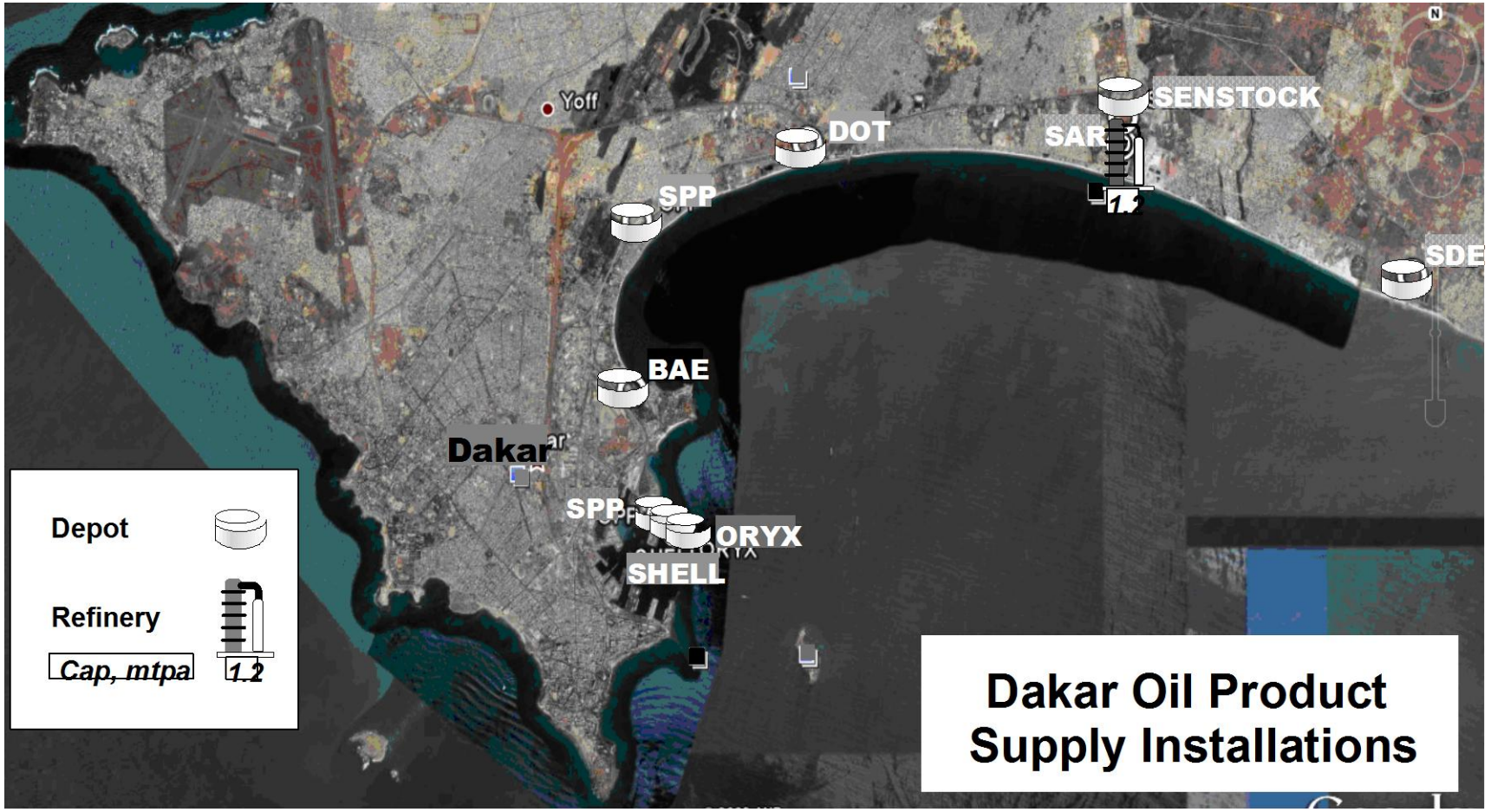
Table A8.4: Dakar – Depots –Petroleum Product Storage
Excludes Jet Fuel at airport and LPG

Name/ Location	Ownership %	Type of products	Capacity, m^3		Receiving modes	Lifting modes	Markets served	Comments
			White	black				
Société des Produits Pétroliers (SPP) Km 4.5 Bd du Centenaire de la Commune	Total 100	white	39 653		Pipeline from 3 * sources	pipeline, road tanker, railwagon, ǂ	Land- Senegal Mali, by road tanker and railwagon	Capability to load large road tankers, bridging of jet to airport by road tanker
Bel Air Entreposage (BAE)	Shell 100	white	39 200		Pipeline from 3 * sources	pipeline	Temporary storage. "parking" of product and transfer by pipeline to other depots for lifting to markets	
Société Dakaroise d'Entreposage (SDE)	Total 50 Shell 50	black		7 650	pipeline from SAR or from the port	pipeline, road tanker,	Senelec Kounoune Power Sococim	Dedicated to Senelec Kounoune et Sococim
Dakar Ocean Terminal (DOT)	Libya Oil 50 Shell 50	white black	49 200	5 100	Pipeline from 3 * sources	pipeline, road tanker, railwagon	Land- Senegal Mali, by road tanker	Capability to load large road tankers, bridging of jet to airport by road tanker
SENSTOCK Km 18 route to Rufisque at Mbao near SAR	State (Petrosen) 66 DIPROM Group 34	white black	24 000	5 000	pipeline from SAR	Road tanker	Land-Senegal Plans to be transhipment terminal for region	Plans to expand and to have a sea-line for loading tankers
Jetée Nord Shell	Shell 100	Gasoil black	20 100	32 800	Pipeline from 3 * sources	pipeline, road tanker, sea tanker	bunkers, FO 380 Senelec	
Jetée Nord SPP	Total 100	Gasoil black	35 420	27 499	Pipeline from 3 * sources	road tanker, sea tanker	bunkers, FO 380 Senelec	
Oryx	Addax 100 ITOC	Gasoil black	29 500	18 500	Pipeline from 3 * sources	pipeline, sea tanker	bunkers, FO	

TOTAL Industry Of which, GPP INDÉPENDENTS			**237 073** 183 573 53 500	**96 559** 73 059 23 500				

*SAR storage, port, other depot,

Figure A8.1: Dakar Oil Product Supply Installations



3. Market

Table A8.5 summarizes the evolution in the Senegal domestic market for oil products for the period 2004-2007. The total demand in 2007 was 1 870 000 m^3 up from 1 597 000 m^3 in 2004. This represents an annual compound growth rate of 5.4% over the period. The strongest growth was in jet fuel and gasoil while gasoline and black products were essentially flat.

Table A8.5: Historical Demand for Petroleum Products in Senegal, 10^3 m^3

White Products	2004	2005	2006	2007	% p.a. growth
Total Gasoline	141	135	136	135	*-1.5%*
Kerosene	21	12	10	6	*-33.5%*
Jet	242	238	286	350	*13.1%*
Gasoil (autodiesel)	607	554	639	706	*5.2%*
Sub-total WP	**1,011**	**938**	**1,071**	**1,198**	***5.8%***
Black Products					
Diesel Distillate Oil (DDO)	132	243	161	77	*-16.4%*
Fuel Oil 180 Cst	44	45	37	20	*-22.6%*
Fuel Oil 380 Cst	410	430	354	445	*2.8%*
Sub-total BP	**586**	**717**	**553**	**543**	***-2.5%***
GRAND TOTAL	**1,597**	**1,656**	**1,624**	**1,870**	***5.4%***
LPG (000s tonnes)	**128**	**136**	**132**	**121**	**-1.9%**

LPG consumption hit a peak in excess of 136,000 tonnes in 2005 and then declined to 121,000 in 2007. This was due to a combination of tightening up on the control of "leakage" across neighboring borders of subsidized 6 kg cylinders, and unfulfilled Senegalese demand due to import cargo financing problems. The "apparent demand" of the previous couple of years included, therefore, some volumes that were actually being consumed in neighboring countries. The import cargo financing problems have been exacerbated by a delay in reimbursement of 6 kg subsidies by the state to LPG operators.

4. Pricing & Taxation

The petroleum product prices to final consumers in Senegal are controlled under a formal, import parity price (IPP) structure.

The cost build-up begins with a hypothetical product sourcing assumption, or FOB reference price for each product In this case they use an average of Platts CIF NWE for the appropriate product grade. To the FOB price assumption is added a reference market marine freight rate, trader's margin and freight-related charges such as cargo losses and insurance. Port charges and a hypothetical depot charge are added as well as the debt amortization (FSIPP) poste to arrive at import parity excluding any taxes. To this import parity for each product are added the taxes, transport equalization and the distributor and retail margins to arrive at the pump prices for each product.

The frequency of adjustment in Senegal is every 4 weeks; the main adjustment factors for this short-term change are the FOB price and reference marine freight. The price regulation also incorporates provisions to review and adjust as necessary the margins and transport costs on a yearly basis. Table A8.6 is a simplified summary of the price structure that was applied effective November 29, 2008.

Table A8.6: Senegal Retail Price Structure, FCFA/litre
Effective November 29 through December 27, 2008

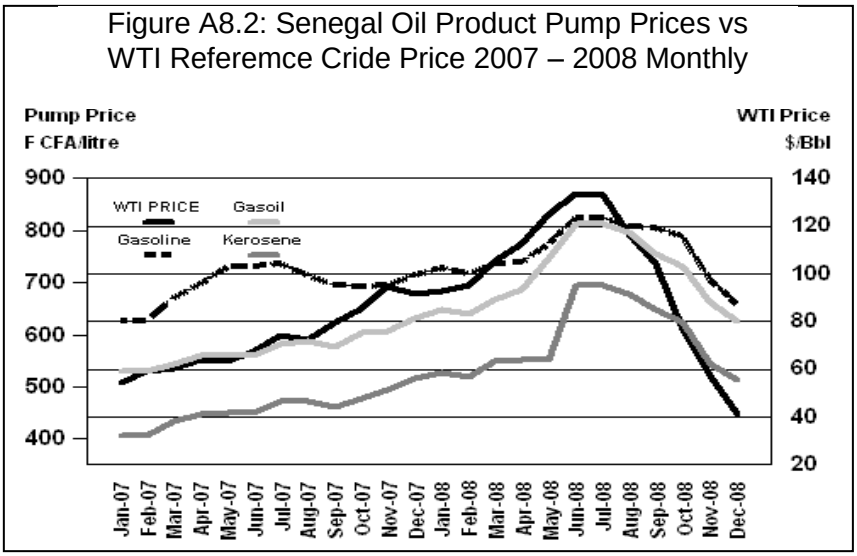
	Gasoline Super	Kerosene	Gasoil
Ex-Refinery Price to Distributor (IPP)*	270.56	357.80	345.93
Total taxes, government take	326.28	94.04	217.91
Local/national Transport (perequation)	12.00	12.00	12.00
Distributors' Margin	38.66	38.66	38.66
Retail Margin	10.50	10.50	10.50
Pump Price	**658**	**513**	**625**

** Note each IPP includes 35 F CFA for the SAR debt amortization (FSIPP)*

During the 2007-2008 period of extreme international price escalation Senegal stuck faithfully to its automatic IPP price adjustment formula. In other words it maintained tax collections at normal levels and achieved full cost recovery through prices at the pump without any attempt at stabilization. It is the only country in the 5 country region to do this.

The graph, Figure A8.2, provides an illustration of the evolution in Senegal's pump prices compared with the WTI reference crude price over this 2007-2008 period of extreme price escalation. It can be seen that the pump prices tracked the pattern of WTI price changes.

Figure A8.2: Senegal Oil Product Pump Prices vs WTI Referemce Cride Price 2007 – 2008 Monthly



The graphs included as Figures A8.3, A8.4 and A8.5 are plots of the pump price for each key product vs. the respective Spot FOB Med reference prices for the same period both expressed in the same currency units. The differential between pump price and Spot price is included in the same plot.

It may be noted that there was a slight elevation in the differential between pump prices and Spot prices for all three products - gasoline, kerosene and gasoil in the period mid to late 2008. This points to a systematic change in a margin or tax item in the price structure for these products. The differentials for both products return to 2007 levels in late 2008, early 2009.

Figure A8.3: Senegal Gasoline Pump Price vs Spot Price
FOB MED & Pump – Spot Differential
2007 – 2008 Monthly

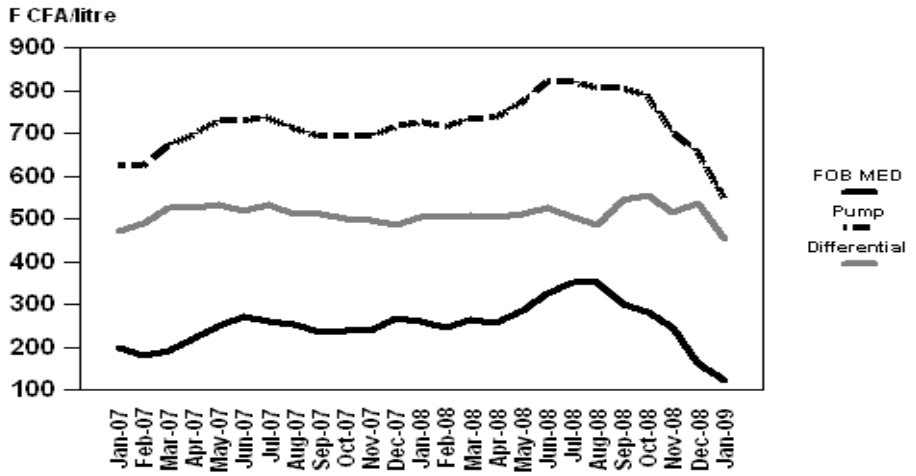


Figure A8.4: Senegal Kerosene Pump Price vs Spot Price FOB
MED & Pump – Spot Differential
2007 – 2008 Monthly

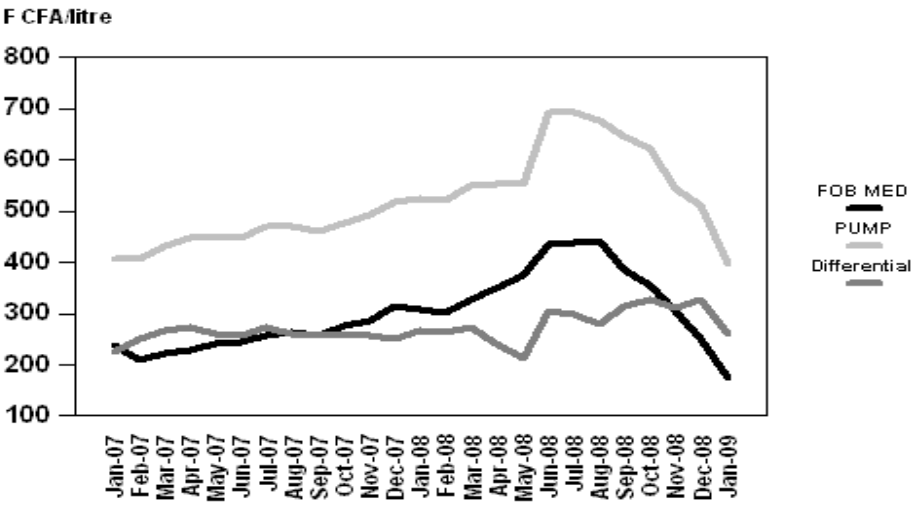
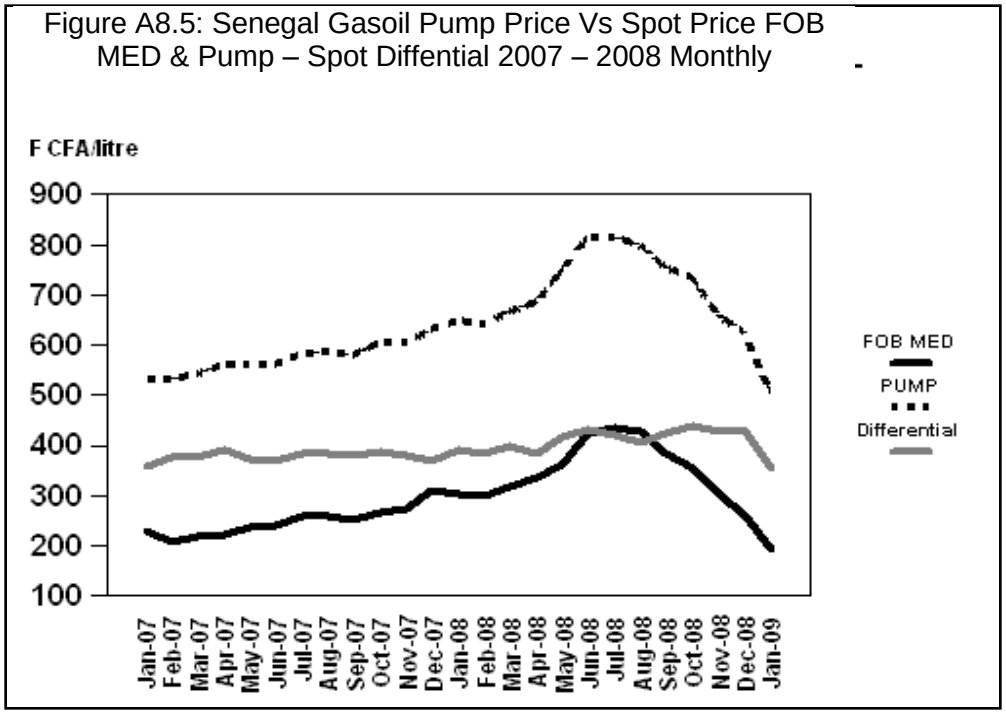


Figure A8.5: Senegal Gasoil Pump Price Vs Spot Price FOB MED & Pump – Spot Diffential 2007 – 2008 Monthly



5. Other Sector Issues and Findings

1) SAR Refinery Protection: It appears that the government of Senegal does not wish to entertain any recommendations pursuant to abandoning the SAR refinery. The maintenance of this high-cost, inefficient facility in the supply system of Senegal through a protective subsidy will result in a significant macroeconomic cost to the nation.

2) Procurement of Deficit Product: The system of allocation of the refinery deficit product importation does not seem to be working properly. As indicated above, the market leader for all sector activities, Total, dominates this process. Senegal should consider instituting a system of joint procurement under international competitive bidding using a similarly-constituted procurement committee as they now have for the deficit product. The results of these bids in terms of actual landed costs should be incorporated into the price structure. In order to make this joint procurement system work, measures would also have to be taken to mitigate other aspects of unfair competition such as true open access to depot receiving/storage/dispatching capacity.

3) Price Stabilization: Senegal should be commended for maintaining its automatic IPP price structure functioning strictly in accordance with the regulations throughout the extreme run-up in international prices of 2007-2008.

4) Legal & Regulatory Framework: With its comprehensive reforms of 1998, Senegal already has a fairly well-formulated legal and regulatory structure and has made a good start on the institutional framework to accompany this. It has identified further improvements to this framework to be instituted in the short-medium term:

   - Review and update product specifications;
   - Review and strengthen legislation enforcing open access to depot receiving/storage/dispatching facilities;

- Review security stocks legislation with a view to switching the obligation to hold stocks from the importers to the distributors.
- Create a downstream regulatory body *"Organe de Régulation des Activités du segment aval du sous-secteur des Hydrocarbures" (ORAH)* through the transformation and reinforcement of the present CNH.

5) Valuation of Potential Cost Efficiency: The majority state-owned refinery, SAR, went into major debt and became insolvent due principally to being uncompetitive with an import parity price structure established under the reforms of 1998. This IPP structure is considered an efficient structure, with landed costs that importers of finished products in reasonably-sized 30,000 tonne cargo lots could realize. In order for the refinery to have a hope of achieving this level it would have to make considerable investments in expanded, more complex processing and in efficiency/ENCON projects. The refinery is considered to have a cost structure at least 10% higher than the "efficient" IPP. An achievement of efficiencies equivalent to 10% 0f IPP would result in a 30 F CFA/liter reduction in the pump prices per product, equivalent to a reduction of 4.6% in average pump prices over the 2007-2008 period. The annual amount equates to 58.5 billion F CFA or some US$ 124 million at current exchange rates.

Annex 9 Kenya

The level of demand, good logistics infrastructure and positive market features should allow for efficient pricing in Kenya and retail pricing has been liberalised for over a decade. However, some institutional and regulatory issues are constraints. The government of Kenya (GoK) has recently indicated its intention to re-introduce retail price controls and a serious scandal involving the Kenya Pipeline Company (KPC) has thrown into question the efficiency of Kenya's refined petroleum product system.[18]

1. Legal, Regulatory, Institutional framework – Sector Organization

1.1 Introduction

Kenya's institutional framework has both positive and negative features in terms of oil pricing efficiency. Positive aspects are: a recently established, independent, and seemingly well funded regulator, Energy Regulatory Commission (ERC), which is becoming more effective, and significant participation by the government in all links of the supply and marketing chain greatly reducing barriers to entry by new oil marketers. Potentially offsetting these, the Ministry in charge of sector oversight, the Ministry of Energy (MoE) lacks resources.

1.2 Legal/Regulatory Framework

The Energy Act of 2006 provided the legal framework for an independent ERC which effectively started work, from an oil perspective, in mid-2008. At the same time consultants have been engaged, and are working on the preparation of detailed legislation covering all aspects of the sub-sector. Moreover, the ERC appears to be well funded.

However, regulatory independence is often difficult to guarantee. For example, in Nov. 2008 the Ministry of Energy in Kenya advised the KPC of tariff increases even though this is clearly within the role of the newly created ERC.[19]

Table A9.1: Salient Regulatory Features of Kenya

End-user pricing basis	Liberalised (1)
If controlled, price changes are :	n.a.
Primary governing legislation	Unknown, mid-1990s
Economic regulator	ERC
Effectiveness / "resources"	Start up mid-2008
Primary governing legislation	Energy Act 2006
Price management / monitoring	Under
Economic operator licensing criteria	preparation
Fair trading	by
Contingency stocks	consultants
Technical oversight	ERC
Effectiveness / "resources"	(see economic
Primary governing legislation	regulator)
Infrastructure & operating standards	ERC
Product qualities	KBS
Subjective assessment of enforcement	Weak

Notes :
(1) Kenya is planning to re-institute price controls.
Source : Consultant interviews with ERC and industry, Nairobi mid-November, 2008.

In addition to regulatory challenges, enforcement is an additional hurdle and needs vigorous on-going action on the part of Kenya's Monopolies and Price Commission, the nascent ERC and other relevant government bodies. The Petroleum Institute of East Africa's (PIEA) reported[20] that there was an "upsurge in export dumping" revealed in July, 2008. The article[21]

[18] Sources: (Kenya's) The Daily Nation, Jan. 10th, 2009 AND: www/Kenya Pipeline Company/moseskemibaro.com/16 January, 2009.

[19] Review of KPC Tariff Rates. Ref Nº ME/CONF/3/1/1 dated Nov 14th, 2008. Letter from PS, MoE to MD of KPC.

[20] The Petroleum Institute of East Africa's (PIEA's) Third Quarter, 2008 journal, Petroleum Insight, page 38

called upon the ERC, the Kenyan Revenue Authority (KRA), and the Kenyan Bureau of Standards (KBS) to intensify monitoring and for the KRA to follow through with legal actions. It is hoped an effective ERC will contribute to this through better monitoring and regulatory control of OMCs, to minimise unfair practices and thus preclude the need to revert to price controls.

1.3. Institutions Specific to the Hydrocarbons Sector

State-Owned or Controlled Enterprises

Two state-owned companies, and a state-controlled one, play important roles in Kenya's downstream oil sector:

The Kenya Petroleum Refineries Ltd. (KPRL),

KPRL, located in Mombasa, is the sole crude processing facility in Kenya. It is 50% owned by the GoK and, enjoying preferential treatment regarding products supply, is the single most import source of refined products for the country. Essar Oil and Gas in 2009 acquired the remaining 50% from the three previous owners—BP 17%, Shell 17%, and Total, which in turn had recently acquired Chevron's 16% interest.

The Kenya Pipeline Company (KPC)

KPC is 100% owned by the GoK and owns and operates the country's white products pipeline network, including several strategic terminals, from Mombasa to Nairobi and beyond to Lake Victoria and Eldoret.

The National Oil Company of Kenya (NOCK)

NOCK is 100% owned by the GoK and is an important OMC in Kenya with some 4% of market share. Amongst other activities it owns a key oil depot in Nairobi.

Private Sector

In addition to state-owned NOCK, there are a total of twenty-five private OMCs operating in Kenya.

Table A9.2: Kenya Market Shares by Company

Rank	Company	% Share	HHI (1)
2	Shell (2)	21	454
	Total	20	404
	Chevron	12	146
1	**Sub-tot Total / Chevron (2)**	**32**	**1,037**
3	Kobil	18	328
	Sub-total top three	**72**	**1,818**
4	Libya Oil	8	62
5	Kenol	5	27
6	National Oil (Corp of Kenya)	4	14
7	Gapco	3	7
8	Bakri International	2	4
9	Galena Oil Kenya	1	2
10	Engen Kenya	1	1
11	Haas Petroleum	1	1
	sub-total top eleven	**96**	**1,936**
	Remaining fifteen	4	1
Total		**100**	**1,937**

Notes :

1 HHI :Hirfendahl-Hirschman Index; the sum of the squares of individual market shares. A common measure of market concentration

2 Shell was ranked first until the November, 2008 acquisition of Chevron by Total.

3 Without the above acquisition the HHI would have been 1 451

Source: Petroleum Insight, Third Quarter, 2008, Page 40. Petroleum Institute of East Africa.

Table A9.2 shows that, despite a relatively large market and this significant number of OMCs, with the acquisition of Chevron by Total, the market has become fairly concentrated with an HHI

[21] This article confirms the findings of the Consultant based on informal conversations in November 2008 fortified by some 20 years of experience in the Kenya downstream oil sector.

of 1,937 and the top three companies with 72% of the total market. Offsetting this potential market power is the ability of smaller OMCs to ship their supplies from Mombasa via the state-owned (KPC) and its terminals in Nakuru, Eldoret and Kisumu and the National Oil Corporation of Kenya's (NOCK) terminal in Nairobi.

2. Supply, Procurement Arrangements and Infrastructure

Involvement by the government in sector supply causes inefficiencies for several reasons. First every OMC must process crude at the KPRL's refinery to the extent of approximately 50% of their domestic white oil requirements[22] such that the KPRL operates at its maximum economic efficient level of about 1.6 million tonnes p.a. This is done to protect the refinery which, otherwise risks closure absent an extensive, and expensive, modernisation. As 50% owner, the GoK does not have the resources to fund their pro-rata share of the investment. In any case, the government wishes to maintain this significant industrial enterprise, which adds a small cost to end-user prices. It may, however, be offset by economic gains in the Mombasa region through the continued operation of the refinery.

Government involvement in the import process also causes inefficiencies. As a condition for becoming a marketer OMCs must participate in two "Open Tender Systems" one for crude and one for products.

All crude treated at KPRL is purchased on an open-tender basis and is owned pro-rata by the OMCs; they all pay the same price, including the same processing fee. OMCs are also required by Legal Notice Nº 197 dated 2nd Dec, 2003 to import roughly two thirds of remaining refined products needs through a second "Open Tender System" for products. (Depending on supply and demand conditions the OMCs are allowed to source the balance of their needs-- approximately 15% -- independently.)

Each OMC also has the right to bid to supply either, or both, of these tenders, i.e. to meet most of the country's monthly needs of either crude or products. Both open tender systems are centrally coordinated by the MoE.[23] However, the single criterion for winner selection is price.

Theoretically "Open Tender Systems" are fine, except:

- They oblige Kenya to continually rely on month-to-month purchases;
- Any OMC may bid, and win;
- There is the issue of single sourcing.

Kenya should see lower supply costs if purchases were based on long term contracts (one to two years) to allow for optimisation of shipping while still purchasing on the basis of spot prices at or around the cargo loading date.

A potentially more serious flaw in the "Open Tender System" is that any OMC, even a small, inexperienced, underfunded one, is entitled to bid, and win; with the possibility of un-qualified companies being responsible for Kenya's supply. This raises the issue of reliance on a single

[22] Motor gasolines, diesel/gasoil, and dual purpose kerosene.

[23] Tender Terms and Conditions for Refined Product Industry Import Deliveries to Kenya Oil Industry, undated copy of the Agreement (which took effect January 1st, 2008) between buyers and sellers. Provided to World Bank consultant in Nairobi in November 2008.

supplier.[24] Even had Triton been a long established oil company a failure could occur. A country's reliance on a single supplier is not ideal, unless it has no other options. But Kenya has them, as it could:

- Liberalise product supply completely (which could result in closure of KPRL without the addition of a minimal tariff protection);
- Maintain the "OTS" system but split the tenders into two or more parcels awarded to different companies (Table A9.4 indicates Kenya imports approx 200 000 m^3 of products per month, easily enough for three separate tenders – cargoes of about 50 000 dead weight tonnes.);
- Add financial and other criteria to the right to bid. Although this would exclude some smaller companies, as noted in Section 1, this would be advantageous.

The government's 100% ownership of KPC, including the Kipivu Oil Storage Facility (KOSF) at the Kurmani Oil Jetty (KOJ) and several terminals along its route, is a positive factor. In addition to the logistical efficiencies it significantly reduces barriers to market entry by new participants.

Involvement by the government in marketing has also contributed to market efficiency, especially through the construction of NOCK's depot and loading racks in Nairobi. This has allowed smaller companies to access supplies delivered up the KPC by means of "third party" throughput agreements. (Regrettably, without adequate OMC license criteria too many unqualified companies entered the market). Before the opening of this depot the several majors with depots in Nairobi were unwilling to provide "third party" access to competitors at reasonable rates.

The preceding determinants of petroleum pricing efficiency suggest Kenya has the potential for competition assuming stricter license criteria for OMCs and an effective ERC. In this regard Kenya is moving in a positive direction as Table A9.1 shows.

To make the KPRL's Mombasa refinery as efficient as possible Kenya, through the KBS has maintained two grades of gasoline; these are understood to be premium, with 93 RON and regular with 87 RON. This allows the refinery to maximise the use of its light distillates. At the same time the lower octane gasoline (which has a lead replacement additive) is satisfactory at the higher altitudes where Kenya's main consuming centers are located.

Absent some short term pipeline bottlenecks, Kenya's refined product logistics infrastructure, shown in the following Figure A9.1, is good relative to regional standards.

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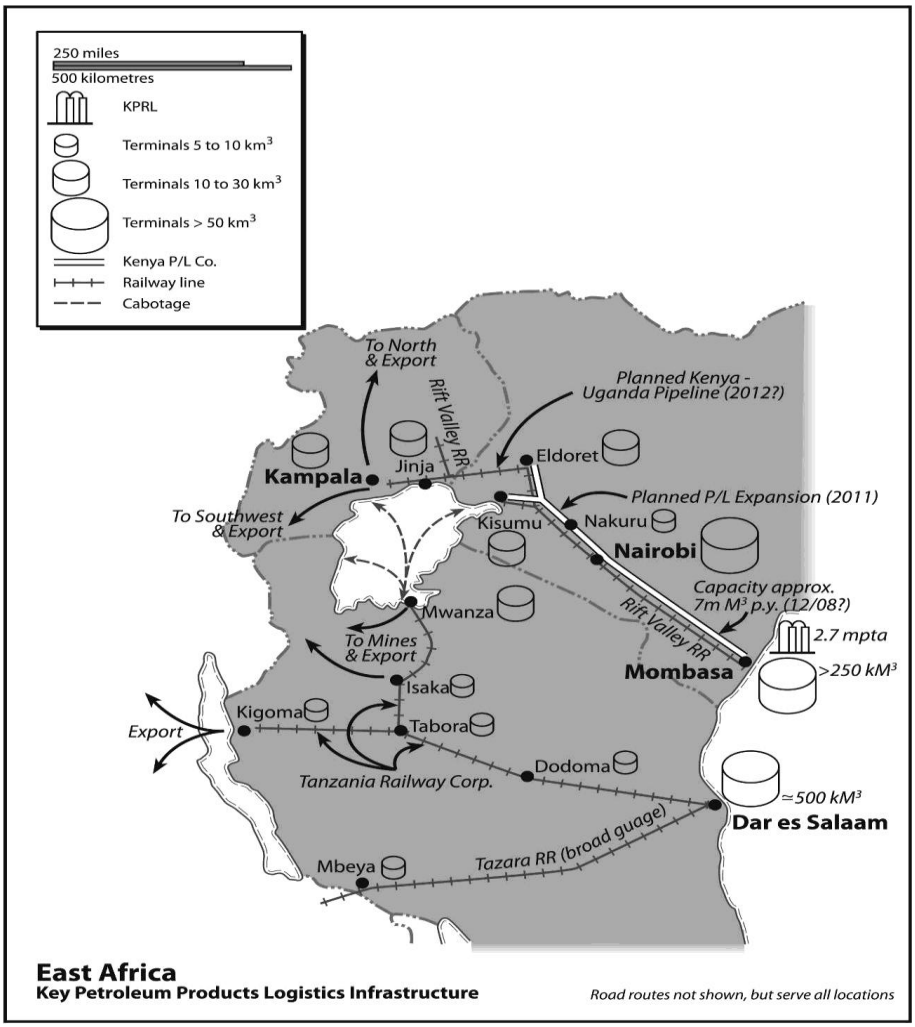
[24] This became evident in the "Triton" scandal of late December, 2008, described by the Kenyan Government as "criminal fraud" on part of Kenya Pipeline Company and Triton, a local oil marketer. The firm collapsed, taking with it at least Sh7.6 billion (considered by some as a conservative figure) of financiers' money. Other oil marketers are said to have lost billions worth of oil in consignments that never reached them. . Read more at several Internet Sites, e.g.: http://www.nation.co.ke/magazines/smartcompany/-/1226/516800/-/st7qdxz/-/index.html

http://www.nation.co.ke/oped/Opinion/-/440808/514270/-/428re6/-/index.html

http://www.capitalfm.co.ke/news/Local/Triton-scandal-causes-panic-in-govt-2919.html

Figure A9.1: East Africa – Key Petroleum Products Logistics Infrastructure



The key features of this infrastructure are summarised in Table A9.3. The Kenya Petroleum Refinery Ltd. (KPRL) is the single most important source of refined products for the Kenyan market.

In addition to the KPRL, the primary point of imports (crude and products) is the Kurmani Oil Jetty and adjacent Kipivu Oil Storage Facility in Mombasa harbour. The jetty is capable of receiving 80 000 dead weight tonne (dwt) tankers, more than adequate for refined product cargoes which typically would be from 30,000 to 60,000 tonnes. KOSF, owned by KPC, has a capacity for refined products of just over 275,000 $m^{3.}$ Assuming good co-ordination this should be adequate, and there is additional storage at Shimanzi and KPRL.

There is a second, older oil jetty at Shimanzi, also in the Mombasa harbour where some of the OMCs have their Mombasa oil products terminals. It is believed to accept tankers up to 40 k dwt; the amount of storage in the several depots is not known but is probably in the range of 75,000 m^3.

Table A9.3: Summary of Kenya's Oil Logistics Infrastructure			
Primary Supply Sources (typical)			Imports and KPRL
	Joint purchases		Yes
Primary port for product imports			Mombasa, Kurmani
	Indicative max. cargo size	10^3 dwt	~ 80
Secondary port for product imports			Mombasa, Shimanzi
	Indicative max. cargo size	10^3 dwt	~ 40
Oil storage terminals at primary port		Number	2
	Approximate capacity	10^3M3	> 350
	In terms of days consumption (total 2007)	# of days	33
	Third party access		Yes, Kurmani
Primary transport mode to main consuming centres			Kenya P/L Company
	Current transport capacity		Good with P/L exp.
	Third party access		Yes
Main consuming centre			Nairobi
	Oil storage terminals at main centre	Number	3 or 4
	Approximate capacity	10^3M3	Unknown
	Third party access		NOCK or Quid pro quo
Sources :			
	Port information from: www.sturrockshipping.co.za / Port of Mombasa.		
	KOSF storage and KPC capacities from KPC information sheet		
	provided to Consultant in Dec. 2008 by MoE.		

The two import facilities and the refinery have considerable flexibility. White products can be transferred:

- From KOSF to Shimanzi and KPRL, as well as into the pipeline;
- From KPRL to KOSF and Shimanzi;
- From Shimanzi to KOSF (new pipeline, possibly not yet done) and KPRL (in theory only).

The KOJ and adjacent KOSF are "costed" into the supply chain at low prices. There is no direct KOJ charge against oil product imports; they are levied against the vessel and included in the CIF value. The KOSF fee is only US$ 3.00/m^3 compared with[25] :

- US$ 18.50/m^3 in Tamatave;
- US$ 2.60/m^3 in Durban;
- US$ 9.00/m^3 in Dar es Salaam.

Within the context of East Africa the KPC provides reliable and environmentally safe delivery of white products to Nairobi and beyond to Nakuru, Kisumu and Eldoret. Also, with its terminals and loading racks at the last three, it minimises barriers to market entry for potential new market entrants; third party access at the same rates as all others, is a given.

For white products at US$ 4.35/m^3/100 km[26] KPC is also the least expensive mode of transport. Moreover, these rates include terminal costs except at Nairobi. (In South Africa, the only other E

[25] Sourced from the individual country pricing tables.

[26] Nov. 2008 tariff = 1,530 K Shg/M3 over the 450 km from Mombasa to Nairobi. At 78 K Shg/US$ this is equivalent to US$ 4.35 / US$ / M3. Same rate per 100 km to Nakuru, Eldoret and Kisumu. The rate for exports is about US$ 5.25 / M3 / 100 or approx 20% more. KPC document provided to Consultant by e-m.

& SA country within the study with a product pipeline network, the rate, with much higher throughputs, is US$ 2/m^3/100 km -- also typically including depot costs.)

Oil shipments by road are not allowed for the domestic market; or for export volumes if pipeline line capacity exists. In any case road transport would be in excess of US$ 10/m^3/100 km, causes road degradation, and represents a safety and environmental hazard. Rail is theoretically an option but turn-around times are poor and the rates are not competitive: just under US$ 10/m^3/100 km.[27]

Fuel oil, however, cannot be shipped by pipeline, and as such road or rail transport are the only options. Both cost the same at about US$ 10/m^3/100 km, and there appears to be competition between them for this traffic.

Kenya switched from four to three axle vehicles for safety reasons reducing the quantity hauled by about 25% and hence increasing unit road transport costs. This has taken place throughout East and Southern Africa (it started several years ago in South Africa) and should not be considered an economic penalty. This change did cause shortages in Uganda and inland, but this was due to the lack of professionalism on the part of some OMCs; the changeover was planned and announced well in advance.

3. Market

With domestic demand of approximately 3.9 million m^3 in 2007 Kenya is the second largest market of the seven E & SA study countries. Together with some 0.8 million m^3 of exports this should provide enough competition to keep prices efficient without price controls. This is supported by Figure A9.2, which shows domestic demand by product over the past five years has grown at an annual compound growth rate of over 8% and is potentially more able to be efficient than it was at the time of price liberalisation.[28] Additional detail on the evolution of Kenya product demand is provided in Table A9.2.

To further improve economies of scale from a demand perspective Table A9.4, Indicative Kenyan Refined Product Supply/Demand in 2007, shows that exports added a further 800 000 m^3 to Kenyan throughput in 2007. Moreover, the potential for greater exports reportedly exists, further decreasing OMC unit costs. Unfortunately, however, this additional demand from inland countries has constrained the pipeline system in the short term. (This bottleneck should be eliminated shortly as noted below).

It could be concluded that, in order for for a market of 3.9 million m^3 to sustain twenty-five companies, some of the smaller operators must be cutting costs through the operation of sub-standard retail facilities and/or engaging in practices which do not conform to the established rules. Hence the importance of good governance and sound regulations which are enforced. Another possibility would be that OMCs operating in Kenya can enjoy synergies with their

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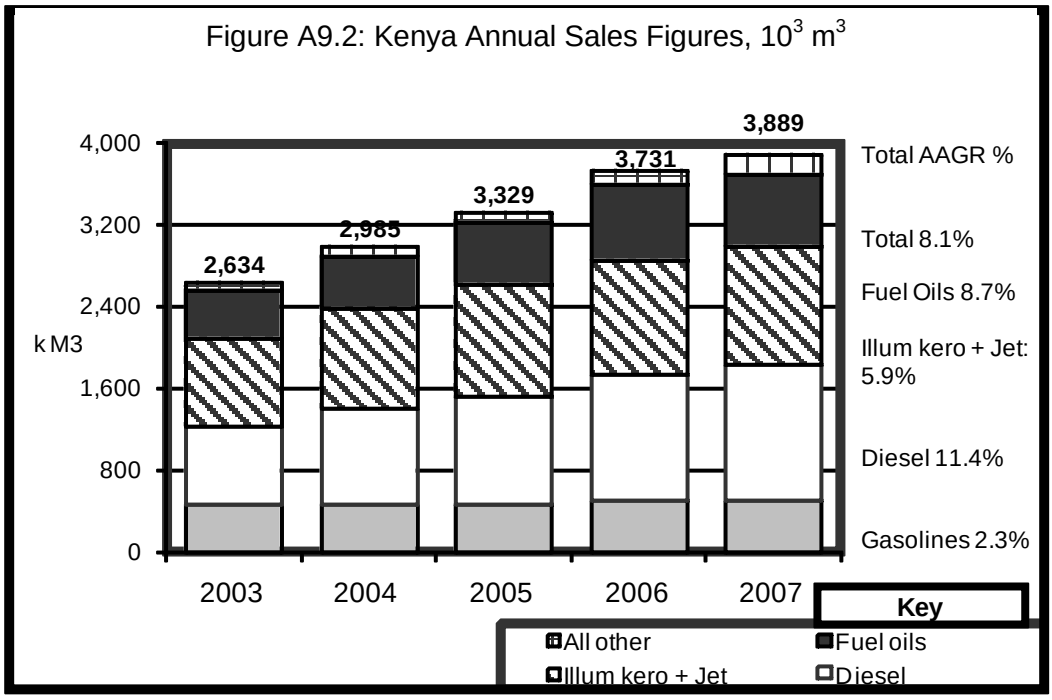
[27] Provided by Actg Commercial Mgr. Rift Valley RR in Kampala; K Shg 5125 / Tn from Mombasa to Nairobi. Note there are no block train rates.

[28] Political violence following the Dec. 2007 election drastically affected Kenya's economy in early 2008 and, with a global recession late 2008, oil demand in Kenya is likely to be less in 2008 than in 2007.

affiliates in neighbouring countries, hence enhancing their scale of operations and reducing unit costs.

Figure A9.2: Kenya Annual Sales Figures, 10^3 m^3



4. Pricing & Taxation

4.1 Gasoline, Kerosene and Diesel

Kenya currently has no price controls. Prices are liberalised at the retail level but there are restrictions regarding supplies. However, as discussed, the government has announced the re-introduction of controls over end-user prices. It feels prices, and hence OMC margins, rose in step with the sharp international price run-ups in mid-2008 but failed to come down at the same rate in late 2008. It is unclear whether this is necessary as Kenya is in the process of strengthening its regulatory oversight and has the market characteristics and logistics infrastructure to support liberalized prices.

As prices are liberalised, retail prices outside of Nairobi reflect transport costs and competitive pressures. In this regard, prices in the main population centers tend not to be too different from those in Nairobi because of the KPC terminals in Nakuru, Eldoret and Kisumu. In fact, it has been reported that retail prices tended to be lower in Nakuru than in Nairobi because of stronger competitive pressures. It was there that many smaller independents first established themselves as they had access to KPC's terminal and this brought prices down. Only after NOCK built its terminal in Nairobi in about 2000 did greater competition come to the capital.[29]

Table A9.5, approximate retail price build-up in Nairobi, gives an indication of OMC margins based on December, 2008 conditions. (Indicative retail margins, based on the experience of the Consultant in the region, are broken out):

[29] Meeting with NOCK, Nov 13th, 2008.

- For premium gasoline the OMC margin was US¢ 19.9 / L;
- For illuminating kerosene it was US¢ 12.4 / L;
- For diesel/gasoil it was US¢ 15.9 / L.

Table A9.4: Indicative Kenya Refined Product Supply/Demand in 2007, 10^3 m^3

Demand		Gasoline	Kerosene	Jet A-1	Gasoil	S.t. White Products	Fuel Oil	S.t. Main Products	Other	Total
	Domestic demand (1)	511	337	812	1,321	**2,981**	707	**3,688**	201	**3,889**
	Exports (2)	201	72	24	352	**649**	128	**777**	4	**803**
Total demand		712	410	835	1,673	**3,629**	835	**4,464**	205	**4,691**
Indicative Supply										
	KPRL Production 10^3 Tns (3)	266	92	205	374	**937**	549	**1,486**	26	**1,512**
	Conversion (4)	1.33	1.25	1.25	1.19		1.0	**1.0**	1.0	
	Production in 10^3 m^3	354	115	256	445	**1,170**	549	**1,719**	26	**2,268**
	Imports (5)	358	295	579	1,228	**2,459**	44	**2,503**	26	**2,529**
Total supply (6)		712	410	835	1,673	**3,629**	835	**4,464**	205	**4,691**
Production as % of dom. dmd.		69%	27%	25%	28%	**31%**	78%	**40%**	13%	**58%**

Notes and Sources ;

1. Energy Regulatory Commission, EFT to Consultant Nov. 2008 : Kenya Annual Sales Figures in M^3
2. Petroleum Institute of East Africa, Oil Industry Sales Volume by Class of Trade in M^3, EFT to Consultant, Nov. 2008.
3. Indicative figures based on 2005 production as reported by the IEA. WWW. Statistics/Oil for Kenya.
4. Conversion from m^3 to tonnes based on standard conversions as used by the RSA.
5. Imports are calculated to balance supply and demand; i.e. imports = total demand less KPRL production.
6. Total supply is assumed to = total demand.

While these do appear high, further analysis over a much longer period of time than one month is required to confirm the result, to ensure that all the correct cost components are identified and included and that the impact of rapidly changing international market prices and exchange rates are properly accounted for. Because the OMC margin is a residual value, small variations in the other components are all reflected within it.

One possible explanation is that market is not large enough to support a large number of OMCs. There may be too much under-utilised retail investment which requires a higher than normal margin to allow for cost recovery.

Table A9.5: Approxmate Retail Price Buidup in Nairobi
December, 2008 in Kenya Shillings and US cents per litre

		Notes		93 RON UNL			Illuminating kero			Gasoil / diesel 0.5% S		
1	**In-bond landed cost**											
	Based on previous month in US$/Tn	1	US$/Tn	527			631			563		
	Conversion M3/Tn		M3/Tn	1.37			1.26			1.18		
			US$/$m^3$	384			499			477		
	Exch rate for previous month in KShg/US$	2		74.50			74.50			74.50		
				KShg/L	**US ¢/L**	**%**	**KShg/L**	**US ¢/L**	**%**	**KShg/L**	**US ¢/L**	**%**
	IBLC expressed in KShg and US ¢/L			**28.6**	**38.4**	**37%**	**37.2**	**49.9**	**62%**	**35.5**	**47.7**	**49%**
2	**Coastal storage and refinery handicap @ 5 % IBLC**											
	Refinery handicap @ 5% of landed cost	3		1.4	1.9		1.9	2.5		1.8	2.4	
	KOSF fee @ US$ 3/M3 + 16% VAT	4		0.3	0.3		0.3	0.3		0.3	0.3	
	Total Cost ex Kenya Oil Storage Facility			30.3	40.6	39%	39.3	52.8	65%	37.6	50.4	51%
3	**Transport cost from Mombasa to Nairobi**											
	P/L tariff to Nairobi @ 1.53/L + 16% VAT	4		1.8	2.4		1.8	2.4		1.8	2.4	
	P/L loss @0.25% of ex-KOSF cost	4		0.1	0.1		0.1	0.1		0.1	0.1	
	Ex-tax cost delivered to Nairobi terminals			**32.1**	**43.1**	**41%**	**41.2**	**55.3**	**69%**	**39.5**	**53.0**	**54%**
4	**Government take**	5										
	Excise duty			19.9	26.7		7.2	9.7		10.3	13.8	
	Road maintenance levy			9.0	12.1		0.0	0.0		9.0	12.1	
	Petroleum development levy			0.4	0.5		0.4	0.5		0.4	0.5	
	Petroleum regulation levy			0.1	0.1		0.1	0.1		0.1	0.1	
	Import declaration form @ 2.25 % of IBLC			0.6	0.9		0.8	1.1		0.8	1.1	
	Sub-total duty and taxes			30.0	40.3	38%	8.5	11.5	14%	20.6	27.7	28%
	Tax paid cost to Nairobi			**62.1**	**83.4**	**80%**	**49.7**	**66.7**	**83%**	**60.1**	**80.6**	**82%**
5	**Indicative local depot and transport costs to end-users**											
	Nairobi depot cost	6		0.6	0.8	1%	0.6	0.8	1%	0.6	0.8	1%
	Local transport	6		0.5	0.7	1%	0.5	0.7	1%	0.5	0.7	1%
6	**Calculated OMC margin incl. stabilisation**	7		11.8	15.8	15%	7.2	9.7	12%	8.8	11.9	12%
7	**Indicative retail dealer margin**	6		3.0	4.0	4%	2.0	2.7	3%	3.0	4.0	4%
8	**Approximate Nairobi pump prices in Dec**	8		**78.0**	**104.7**	**100%**	**60.1**	**80.6**	**100%**	**73.0**	**98.0**	**100%**
	Combined OMC/dealer margin			**14.8**	**19.9**	**19%**	**9.2**	**12.4**	**15%**	**11.8**	**15.9**	**16%**

Notes:

(1) Based on Platts FOB Med price decrease for September averages less November averages applied to the ERC's indicative October landed costs.

(2) Mid-November exchange rate.

(3) A "typical" 5 % level of protection is added as OMCs are obliged to process crude at the refinery. The 5 % includes the processing fee of approx US$ 1.50 /Bbl paid to KPRL. Addition of the import parity prices and the 5 % refinery handicap approximates the ERC's estimate.

(4) The KPC fee is based on a document provided to the Consultant by e-mail by the MoE on Dec. 10th, 2009.

(5) Provided by the ERC by e-file to the Consultant during his mid-November, 2008 field visit except for the import declaration form fee which is from the Petroleum Institute of East Africa; www.petroleum.co.ke / petroleum taxes.

(6) Indicative/typical costs provided by the Kenyan oil industry to the Consultant during his mid-November, 2008 field visit.

(7) Calculated by difference; Nairobi pump prices less: retail margins, local transport, Nairobi depot costs and the tax paid cost to Nairobi.

(8) Provided by the ERC by e-mail dated March 11th, 2009, except for illuminating kerosene which is estimated by the Consultant.

Source: Consultant Sexsmith's estimates based on discussions with the ERC in Nov. 2008.

Starting at the top of Table A9.5, landed costs for all three products are efficient. In addition, the level and structure of duties and taxes do not lead to inefficiencies.

Low logistics costs are favourable to end-user prices. And, while not shown, product specifications have no impact either.[30] Therefore, for retail products the analysis shows that, except at the marketing level where they may be some "competition" problems, Kenya's retail products' pricing is probably efficient.

The solution, however, is unlikely to be found through the re-introduction of price controls. Rather it lies in improved regulatory oversight which should come from the emergence of the ERC into a fully operating entity, a steadily increasing sense of the fairness of institutions in general and better enforcement of existing regulations.

On November 14th, 2008 the ERC announced its intentions to re-introduce price controls through the official notice given as Figure A9.3 on the following page.

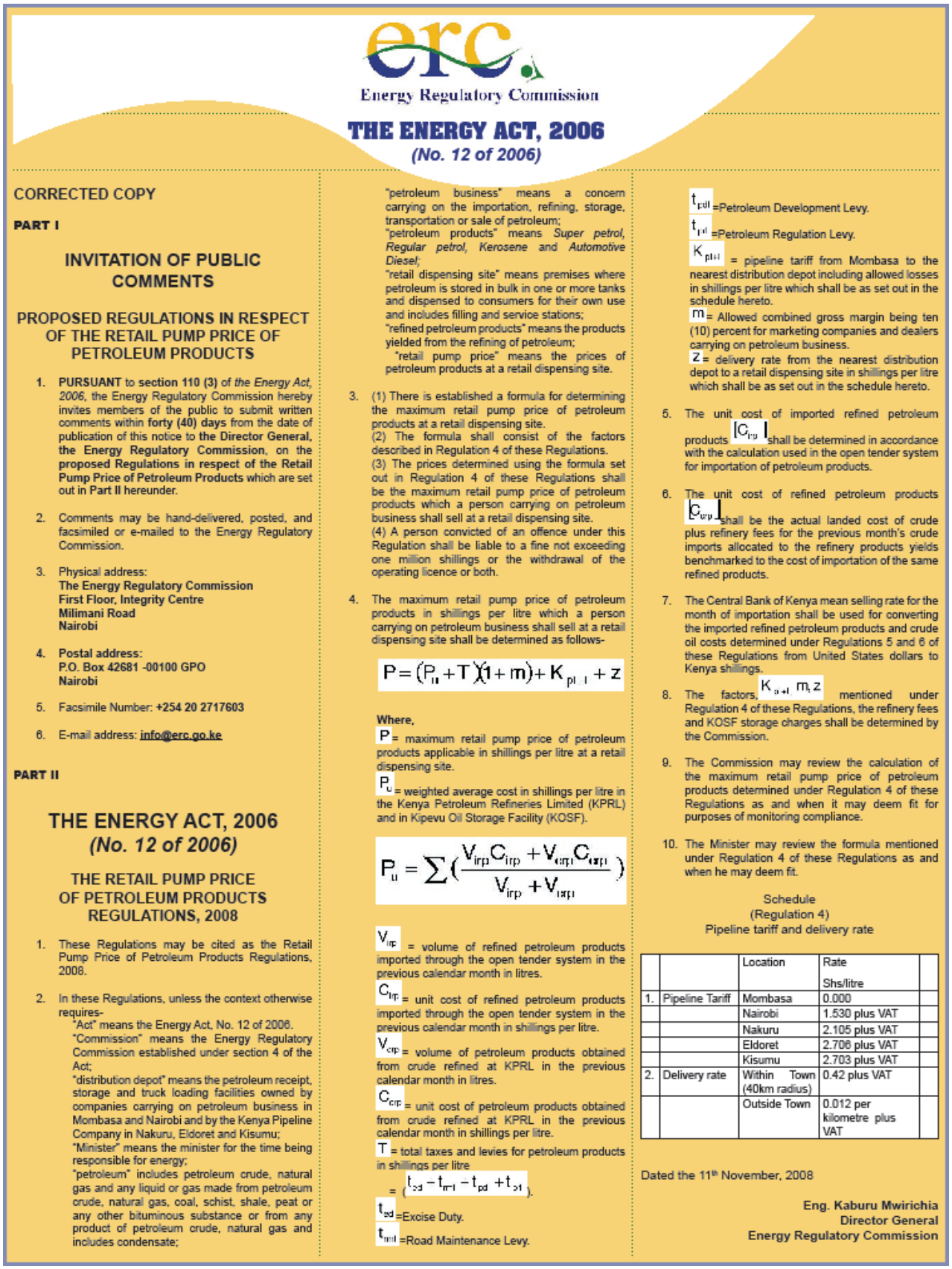
OMC and dealer costs are largely independent of the cost of product supplies ex KOSF. And, as Table 13.5 shows, about 82% of the retail selling price (of all three products) was accounted for by the tax inclusive cost of product delivered to Nairobi.

The formula as proposed by the ERC takes no account of OMC and dealer revenues from related activities, such as convenience stores, etc. Nor does it take account of revenues from sales of non-price controlled products such as jet fuel, or lubricants. Moreover, only 55% of sales of PMS, IK and AGO were made through retail outlets in 2007. There is a possibility that retail customers are bearing a larger-than-necessary margin to "subsidize" sales to commercial and industrial accounts. As such, if the ERC feels it must re-introduce price controls, it should not introduce a percentage-based gross overall OMC/retailer margin.

While the recent sharp downturn in oil prices may well "weed-out" some marginal operators more stringent license requirements on the part of the ERC would also help to rationalize the sector.

[30] However the typical 0.7%S content of diesel, which exceeds the KBS limit of 0.5%S, does impose environmental costs on society. (The breaching of the regulation is ignored).

Figure A9.3: Energy Regulatory Commission



Energy Regulatory Commission

THE ENERGY ACT, 2006

(No. 12 of 2006)

CORRECTED COPY

PART I

INVITATION OF PUBLIC COMMENTS

PROPOSED REGULATIONS IN RESPECT OF THE RETAIL PUMP PRICE OF PETROLEUM PRODUCTS

1. **PURSUANT** to **section 110 (3)** of *the Energy Act, 2006*, the Energy Regulatory Commission hereby invites members of the public to submit written comments within **forty (40) days** from the date of publication of this notice to **the Director General, the Energy Regulatory Commission**, on the **proposed Regulations in respect of the Retail Pump Price of Petroleum Products** which are set out in Part II hereunder.

2. Comments may be hand-delivered, posted, and facsimiled or e-mailed to the Energy Regulatory Commission.

3. Physical address:
The Energy Regulatory Commission
First Floor, Integrity Centre
Milimani Road
Nairobi

4. **Postal address:**
P.O. Box 42681 -00100 GPO
Nairobi

5. Facsimile Number: **+254 20 2717603**

6. E-mail address: **info@erc.go.ke**

PART II

THE ENERGY ACT, 2006
(No. 12 of 2006)

THE RETAIL PUMP PRICE OF PETROLEUM PRODUCTS REGULATIONS, 2008

1. These Regulations may be cited as the Retail Pump Price of Petroleum Products Regulations, 2008.

2. In these Regulations, unless the context otherwise requires-
"Act" means the Energy Act, No. 12 of 2006.
"Commission" means the Energy Regulatory Commission established under section 4 of the Act;
"distribution depot" means the petroleum receipt, storage and truck loading facilities owned by companies carrying on petroleum business in Mombasa and Nairobi and by the Kenya Pipeline Company in Nakuru, Eldoret and Kisumu;
"Minister" means the minister for the time being responsible for energy;
"petroleum" includes petroleum crude, natural gas and any liquid or gas made from petroleum crude, natural gas, coal, schist, shale, peat or any other bituminous substance or from any product of petroleum crude, natural gas and includes condensate;
"petroleum business" means a concern carrying on the importation, refining, storage, transportation or sale of petroleum;
"petroleum products" means *Super petrol, Regular petrol, Kerosene* and *Automotive Diesel*;
"retail dispensing site" means premises where petroleum is stored in bulk in one or more tanks and dispensed to consumers for their own use and includes filling and service stations;
"refined petroleum products" means the products yielded from the refining of petroleum;
"retail pump price" means the prices of petroleum products at a retail dispensing site.

3. (1) There is established a formula for determining the maximum retail pump price of petroleum products at a retail dispensing site.
(2) The formula shall consist of the factors described in Regulation 4 of these Regulations.
(3) The prices determined using the formula set out in Regulation 4 of these Regulations shall be the maximum retail pump price of petroleum products which a person carrying on petroleum business shall sell at a retail dispensing site.
(4) A person convicted of an offence under this Regulation shall be liable to a fine not exceeding one million shillings or the withdrawal of the operating licence or both.

4. The maximum retail pump price of petroleum products in shillings per litre which a person carrying on petroleum business shall sell at a retail dispensing site shall be determined as follows-

$$P = (P_u + T)(1 + m) + K_{pl} + z$$

Where,

P = maximum retail pump price of petroleum products applicable in shillings per litre at a retail dispensing site.

P_u = weighted average cost in shillings per litre in the Kenya Petroleum Refineries Limited (KPRL) and in Kipevu Oil Storage Facility (KOSF).

$$P_u = \sum \left(\frac{V_{irp} C_{irp} + V_{erp} C_{erp}}{V_{irp} + V_{erp}} \right)$$

V_{irp} = volume of refined petroleum products imported through the open tender system in the previous calendar month in litres.

C_{irp} = unit cost of refined petroleum products imported through the open tender system in the previous calendar month in shillings per litre.

V_{erp} = volume of petroleum products obtained from crude refined at KPRL in the previous calendar month in litres.

C_{erp} = unit cost of petroleum products obtained from crude refined at KPRL in the previous calendar month in shillings per litre.

T = total taxes and levies for petroleum products in shillings per litre

$= (t_{ed} - t_{mtl} - t_{pd} + t_{pl})$.

t_{ed} =Excise Duty.

t_{mtl} =Road Maintenance Levy.

t_{pdl} =Petroleum Development Levy.

t_{rl} =Petroleum Regulation Levy.

K_{pl} = pipeline tariff from Mombasa to the nearest distribution depot including allowed losses in shillings per litre which shall be as set out in the schedule hereto.

m = Allowed combined gross margin being ten (10) percent for marketing companies and dealers carrying on petroleum business.

z = delivery rate from the nearest distribution depot to a retail dispensing site in shillings per litre which shall be as set out in the schedule hereto.

5. The unit cost of imported refined petroleum products $[C_{irp}]$ shall be determined in accordance with the calculation used in the open tender system for importation of petroleum products.

6. The unit cost of refined petroleum products $[C_{erp}]$ shall be the actual landed cost of crude plus refinery fees for the previous month's crude imports allocated to the refinery products yields benchmarked to the cost of importation of the same refined products.

7. The Central Bank of Kenya mean selling rate for the month of importation shall be used for converting the imported refined petroleum products and crude oil costs determined under Regulations 5 and 6 of these Regulations from United States dollars to Kenya shillings.

8. The factors, K_{pl}, m, z mentioned under Regulation 4 of these Regulations, the refinery fees and KOSF storage charges shall be determined by the Commission.

9. The Commission may review the calculation of the maximum retail pump price of petroleum products determined under Regulation 4 of these Regulations as and when it may deem fit for purposes of monitoring compliance.

10. The Minister may review the formula mentioned under Regulation 4 of these Regulations as and when he may deem fit.

Schedule
(Regulation 4)
Pipeline tariff and delivery rate

		Location	Rate Shs/litre	
1.	Pipeline Tariff	Mombasa	0.000	
		Nairobi	1.530 plus VAT	
		Nakuru	2.105 plus VAT	
		Eldoret	2.706 plus VAT	
		Kisumu	2.703 plus VAT	
2.	Delivery rate	Within Town (40km radius)	0.42 plus VAT	
		Outside Town	0.012 per kilometre plus VAT	

Dated the 11th November, 2008

Eng. Kaburu Mwirichia
Director General
Energy Regulatory Commission

4.2 Jet Fuel and Fuel Oil

It proved impossible to obtain any specific data on the pricing efficiency of these highly price sensitive markets except that:

- Both products are typically purchased on one year or longer contracts linked (i.e. plus a freight premium) to international reference prices at the time of purchase. Product is sold in US$ and the only "add-ons" for jet fuel are the KPC tariff from the KOSF to the Jomo Kenyatta International Airport (JKIA) and the Kenya Airport Authority (KAA) fee.
- There is an oligopoly situation at Kenya's two main airports with the same, very few suppliers responding to bids.
- For fuel oil there is a trade-off between the international reference price differential between 380 cSt fuel and 180 cSt fuel. Most consumers of fuel oil can use either viscosity. However, FOB prices for the former are much lower but freight, handling and storage costs are higher as the product must be heated. End-users are continually evaluating these differences to select the most efficient delivered cost of fuel.

4.3 Recommendations

- Reconsider the reimposition of price controls after giving the ERC an opportunity to become functional;
- Completely liberalise oil product supplies, reducing the impact on KPRL by instituting a couple of measures:
  - A modest protection through the imposition of a supplemental duty of about 5% on refined product imports but with none on crude oil;
  - A waiver on the quality of gasoil produced by KPRL:[31]
- Continue to encourage the full and effective implementation of the ERC.
  - Encourage the hiring of the full complement of oil industry professionals required to monitor the sector;
  - As part of this ensure more vigorous and frequent monitoring *and publication* of prices and transaction costs at all links in the supply chain;
  - Ensure more stringent OMC licensing criteria come out of the regulatory development process now taking place within the ERC;
  - Fund the ERC by means of a 50% split in revenue sources: a substantial fixed fee for OMCs together with an equal amount paid on a per liter of sales basis.

[31] The current gasoil sulphur specification of 0.5% is not respected in any event.

Table A9.6: Kenya annual sales figures in cubic meters

PRODUCT	Cubic Meters								
						%	Conv.	2007	AACGR
						by prod.	m^3/T	tonnes	03 / '07
	2003	2004	2005	2006	2007				
Avgas	2,133	2,462	2,763	2,752	2,999	0%	1.33	2,255	7.1%
Jet A1	619,359	675,930	710,670	751,927	811,530	21%	1.25	610,173	5.6%
PMS	353,342	376,034	383,267	429,900	437,875	11%	1.33	329,229	4.4%
RMS	103,992	86,034	81,258	79,056	73,261	2%	1.33	55,083	-6.8%
Kerosene	241,505	305,825	389,607	364,234	337,097	9%	1.25	253,456	6.9%
Gas Oil	768,517	948,066	1,052,581	1,221,373	1,320,868	34%	1.19	993,134	11.4%
IDO (1)	28,525	30,787	29,623	45,292	46,890	1%	1.00	35,256	10.5%
Fuel Oils (1)	436,982	472,107	586,661	713,702	660,079	17%	1.00	496,300	8.6%
LPG (1)	40,929	41,884	48,827	64,639	77,350	2%	1.00	58,158	13.6%
Bitumen (1)	4,958	8,262	1,165	14,634	83,745	2%	1.00	62,966	76.0%
Lubricants (1)	32,728	36,508	30,965	39,336	33,464	1%	1.00	25,161	0.4%
Greases (1)	656	604	1,206	3,775	1,424	0%	1.00	1,071	16.8%
Misc					2,093	0%	1.00	1,574	
TOTAL	**2,633,626**	**2,984,922**	**3,329,078**	**3,730,620**	**3,888,675**	100%		2,923,816	8.1%
Notes :									
1	Expressed in tonnes but added as if in cubic meters as is the industry practice in E&SA.								
Source : Energy Regulatory Commission, given to Consultant, Nov. 14th, 2008.									

Annex 10 Tanzania

Petroleum product prices have been liberalised in Tanzania since 2000 and most determinants of pricing efficiency are favourable. Along with Uganda, Tanzania has the most liberalised downstream oil sector of all the E & SA countries within the study. It has no direct government involvement at all.[32] However, indicative December, 2008 OMC margins for retail products are higher than those of Kenya and there are inefficiencies in the sub-sector. Like Kenya; Tanzania feels OMCs were too slow to reduce retail prices as international market prices fell late in 2008.

1. Legal, Regulatory, Institutional Framework – Sector Organization

1.1. Introduction

Tanzania has two government entities responsible for its downstream oil sector:

- **The Ministry of Energy and Mineral Resources,** charged with establishing energy policy, including that for petroleum sector, and oversight of the Tanzanian Petroleum Development Corp.
- The **Energy and Water Utilities Regulatory Authority (EWURA)** is an autonomous, multi-sectoral regulatory authority responsible for technical and economic regulation of the electricity, petroleum, natural gas and water sectors in Tanzania

Tanzania's institutional framework is more or less neutral as regards oil product pricing efficiency. The government now has only a minor role in infrastructure and operating entities. The state national oil company, the Tanzanian Petroleum Development Corp. (TPDC) is responsible for contingency stocks and it owns 50% of the TIPER terminal which is currently being re-furbished.

1.2 Legal/Regulatory Framework

Like Kenya the government is dissatisfied with the slowness with which retail prices declined in late 2008. It feels one cause is import inefficiencies and is contemplating an open-tender system such as Kenya uses. Caution is urged before moving in this direction, not least because of the large number of small, potentially unqualified OMCs who could be awarded the right to import the entire country's needs.

Over sixty cargo imports from January to October, 2008 were analysed.[33] It is highly unlikely that a single company, much less a government agency could accommodate, or match, in terms of price, the range of needs and opportunities open to such a diversified group of importers.

Tanzania does well in terms of regulations which favour retail price efficiency. (Refer to Table A10.1)

[32] The GoT does own TPDC which in turn is a 50% owner of the TIPER storage facility. Oryx, the other 50% owner and operator, told the Consultant TPDC acts as a sleeping partner only.

[33] From a Sturrock Flex Shipping Co. Ltd. report provided by an industry source in Dar es Salaam.

Refined product specifications do not impact price efficiency in Tanzania. Its products' key quality parameters[34] are readily obtainable from international markets and are understood to be the same as in Kenya and Uganda:

- Gasoline: minimum 93 RON unleaded;
- Illuminating kerosene: maximum 0.2%S with a 20 (ASTM D 1322) minimum smoke point;
- Automotive gasoil: maximum 0.5%S with a minimum cetane index of 48.

EWURA appears to be the most effective regulator within the E & SA countries (outside of South Africa) and regularly publishes statistics, (including imports by product and company, storage capacity by location and company, market shares, exports, and retail prices at various locations) on their website.

Table A10.1: Salient Regulatory Features of Tanzania

End-user pricing basis		Liberalised in 2000
	If controlled, price changes are :	n.a.
	Primary governing legislation	Petroleum Act 2008
Economic regulator		EUWRA
	Effectivness / "resources"	Good
	Primary governing legislation	Cap 414, 2004(1)
	Price management / monitoring	Good
	Economic operator licensing criteri	Doubtful
	Fair trading	Unknown
	Contingency stocks	Consultants hired
Technical oversight		EUWRA
	Effectivness / "resources"	Unknown
	Primary governing legislation	Petroleum Act 2008
	Infrastructure & operating standard	Unknown
	Product qualities	EUWRA
Subjective assessment of enforcement		Probably weak

Notes :

(1) In Aug. 2007 the Petroleum (Conservation) Act, Cap 393 (which preceded the Petroleum Act, 2008) and the EWURA Act Cap 141 gave EWURA economic regulatory powers

Source : Consultant interviews with EWURA and industry, Nov 2008 and EWURA www.

Enforcement of existing regulations is, however judged to be weak. The very large number of OMCs and apparent non-respect of infrastructure and vehicle standards puts a severe burden on enforcement. Rather than new rules, greater emphasis on enforcement of existing regulations would be preferable. For example, the *Conseil des investisseurs français en Afrique*'s 2009 edition of Investment conditions rated "fiscal harassment" in Tanzania the highest (i.e. the worst) of all seven E & SA study countries.[35]

1.3 Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled

The government has only a minor ownership role in infrastructure and operating companies:

Tanzanian Petroleum Development Corp. (TPDC)

TPDC, the National Oil Company of Tanzania, is 100% state-owned and was established under the Public Corporations Act n° 17 of 1969 with a mandate to spearhead the development of the petroleum industry in Tanzania. Since the closure of the TIPER refinery, TPDC has been primarily involved in exploration and production, especially as related to natural gas.

Tanzanian and Italian Petroleum Refinery Co. Ltd (TIPER)

Through TPDC the government is a 50% owner of TIPER. Since the early 2000s this Dar es Salaam crude processing facility has been out of service. Several years ago Agip sold its 50%

[34] Provided to Consultant by EWURA during the field visit. Tanzanian Bureau of Standards: TZS 672: 2006(E) for gasoline; TZS 580:2006(E) for illuminating kerosene and TZS 674:2006(E) for automotive gasoil.

[35] Jeune Afrique, N° 2505, 11th to 17th January, 2009. Page 66.

share and management control to Oryx Oil Company Ltd. which is in the process of rehabilitating the storage tanks for an oil products depot.

Private Sector

There are a total of some forty-five OMCs operating in Tanzania. As shown in Table A10.2, the market leader is the local affiliate of multinational, BP, with 16% of the total, followed by Oilcom and Oryx with 13% and 12% respectively

With the dispersion of the market as shown, Tanzania has the least market concentration index (an HHI of 1,107) of all E & SA countries studied. However, the very large number of OMCs raises the need for better enforcement of standards to create a level playing field. This large number of companies to scrutinize of course, places a difficult burden on EWURA, the regulator

Table A10.2: Tanzania Market Shares by Company Inland Petroleum Sales: 2007

Rank	Company	10^3m^3	Percent	HHI (1)
1	BP	209	16	260
2	Oilcom	168	13	168
3	Oryx	158	12	149
	Sub-total top three	535	41	577
4	Engen	111	9	73
5	Total	105	8	66
6	Shell	99	8	59
7	MGS	61	5	22
8	GPB	56	4	19
9	Kobil	51	4	15
10	Chevron	43	3	11
11	Haas Petroleum	27	2	4
12	Gapoil	27	2	4
13	World Oil	16	1	1
14	Mansoor	15	1	1
15	Gapco	14	1	1
	sub-total top fifteen	1,159	89	1,106
	Remaining approx thirty	137	11	1
Total		**1,296**	**100**	**1,107**

Notes :

1 HHI : Hirfendahl-Hirschman Index; the sum of the squares of individual market shares, a common measure of market concentration

Source: EWURA, Petroleum Import Report, 2007 Table 1.0. By e-mail to Consultant.

2. Supply, Procurement Arrangements and Infrastructure

Table A10.3 below, and the previously shown East African logistics' map, indicate the oil products petroleum infrastructure is generally favourable in Tanzania. However, there are constraints in the Port of Dar es Salaam, and the rail network, especially the Tanzania Railway Corp, is not effective, thus road transport costs are probably higher than they need be.

Demurrage is excessive at the modern Kurasini Oil Jetty (KOJ). Almost sixty vessels (> 5 000 dwt) discharged at KOJ 1 between Jan and Oct, 2008; approximately one every 5 days. These vessels discharged up to 32 000 tonnes with the median and average cargo sizes being about 20,000 tonnes.[36]

[36] Ibid.

The median discharge time was 3 days (only 263 tph); the average was 278 tph or about 335m^3/hr. These times compare to an allowed 36 hours before demurrage and a design discharge rate using the overhead loading arms of 700 m^3/hr. The main reason for the slow discharge rate is the Tanzania Revenue Authority's (TRA's) installation of flow meters instead of the almost-universally used tank dips. They have done this to minimise cheating but there are more effective ways of doing this, such as better enforcement of existing rules or the requirement to post bonds on transit product such as is done in Kenya.

Table A10.3: Summary of Tanzania's Oil Logistics Infrastructure

Primary Supply Sources (typical)			SA, Middle East
	Joint purchases		No
Primary port for product imports			Dar es Salaam
	Indicative max. cargo size (KOJ 1)	10^3dwt	45
Secondary port for product imports			No
	Indicative max. cargo size	10^3dwt	< 10
Oil storage terminals at primary port		Number	13
	Approximate capacity	10^3m^3	485
	In terms of days consumption (total 2007)	# of days	137
	Third party access (1)		Good
Primary transport mode to main consuming centres			Road
	Current transport capacity		Poor
	Third party access		Yes
Main consuming centre			Dar es Salaam
	Oil storage terminals at main centre	Number	see above
	Approximate capacity	10^3m^3	" " "
	Third party access		" " "
Notes:			
1)	However, Section iii (d) of EWURA's Order nbr. 07-010 dated Oct 8th, 2007 said :		
	"Third party access…is not transparent thus resulting in complaints of high hospitality		
	charges, discrimination and denial by storage facility owners to local OMCs".		
Sources :			
	Port of Dar es Salaam www, EWURA and Consultant interviews with industry.		
	Also Annex 4.1.		

Factors other than pumping rates also cause demurrage. The Dar es Salaam Ports Authority does not have adequate tug boats available and there are waits in the outer harbour for tides and daytime port entry for larger vessels. In the view of one OMC if the Port were run more efficiently the demurrage would drop significantly.

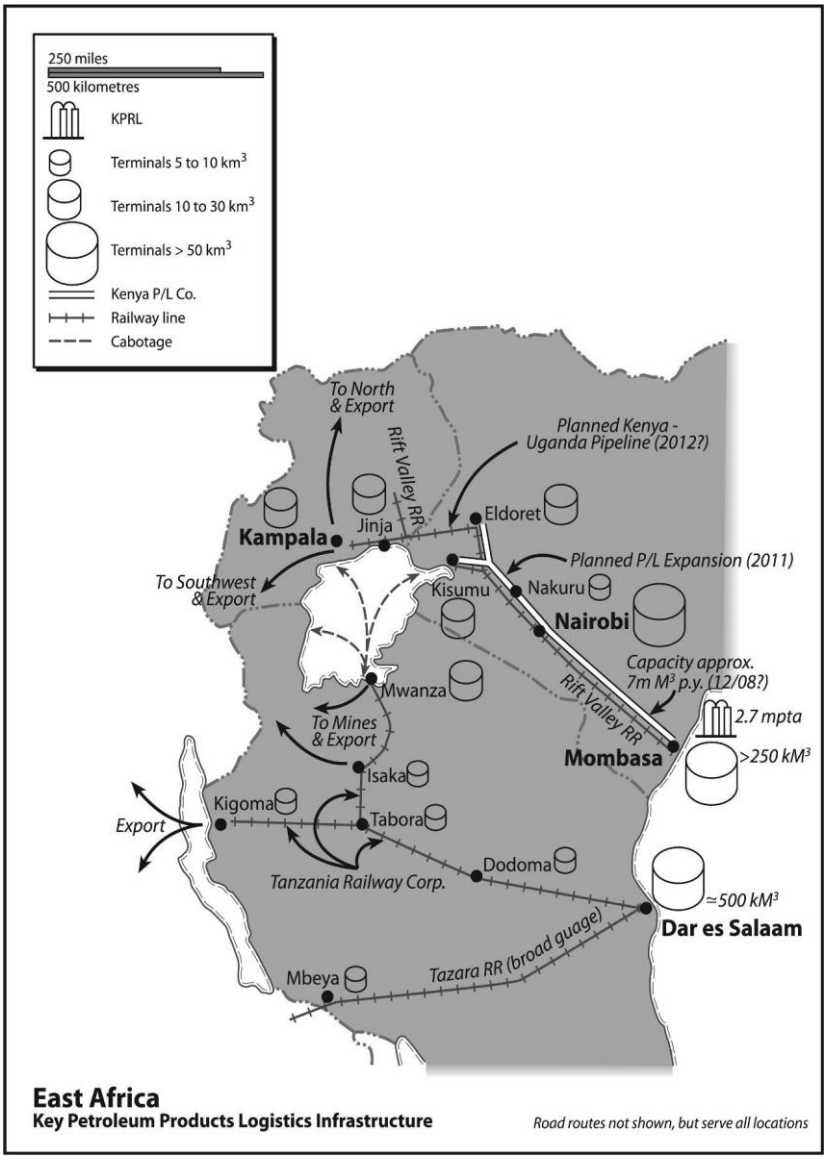
Dar es Salaam has the greatest number and diversity of oil terminals in all of SSA. As Table A10.3 shows there are 13 separate installations with a total storage capacity of almost 500 000 m^3 equivalent to 137 days consumption. This is only 3.5 tank turnovers per year, well below typical or efficient numbers. At a minimum under East African conditions there should be one turnover every two months. (EU or North American facilities aim for several turnovers per month.) Despite the concerns noted by EWURA (in Footnote nº 1 of Table A10.3) this diversity has resulted in low terminal fees.

There is also a considerable, and probably efficient, depot network outside of Dar es Salaam as the East African Logistics map, Figure 14.1 indicates. However, effectively all transport is done by road. The two railways, especially the (East African) standard gauge Tanzania Railway Corp., are not competitive in terms of operational efficiency, and lose out to more expensive road haulers.

Tanzania is, however, moving to advance the role of rail transport. In January, 2009 it signed a Memorandum of Understanding with Rwanda and Burundi to extend the rail network from Isaka, (shown on the East African logistics map and already a dry customs port) into Rwanda and Burundi.[37]

Industry sources advised that because of very limited competition from rail, road transport rates were higher than in Kenya. This is a source of price inefficiency. Hopefully, as the two railways work to improve their services, road rates will come down.

Figure A10.1: East Africa – Key Petroleum Product Logistics Infrastructure



Vehicle standards are a more serious issue adding costs to end-users. The major companies have very strict standards for their contract haulers. However, this is not the case with many of the smaller OMC's. Better enforcement of existing vehicle and driver standards would help create a more level playing field, essential for fair competition and fair prices.

Like Kenya, Tanzania recently switched from four axles to three axle vehicles.[38] As previously discussed, this is not taken to contribute to price inefficiency.

3. Market

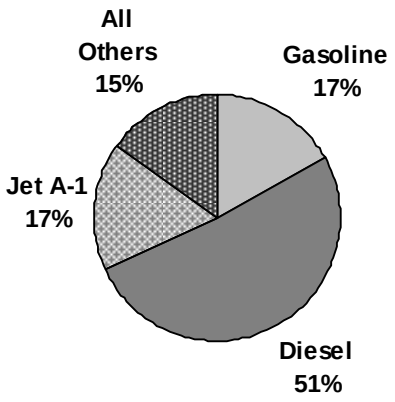
[37] Central African Railway. Tanzanian Ministry of Transport website.

[38] Refer to Section 3.4 in the preceding chapter.

Tanzania has the third largest domestic market of the seven countries – some 1.3 million m^3 in 2007. Dar es Salaam is also a major supply point for neighbouring countries, especially the DRC, Zambia, Burundi, Rwanda[39] and Malawi. In 2007 approximately 450 000 m^3 transited Dar es Salaam allowing the Port and OMCs to enjoy greater economies of scale.

Figure A10.1[40] shows that approx half of all of Tanzania's demand is for diesel, one sixth each for motor gasoline (petrol) and Jet A-1, with the remaining 15% spread amongst fuel oil, kerosene and LPG.

Figure A10.2: Share of 2007 Oil Product Demand by Product in Tanzania



Source: EWURA, Petroleum Import Report, 2007

4. Pricing & Taxation

4.1 For the retail products: gasoline, illuminating kerosene and gasoil/diesel

Tanzania's downstream oil sector is completely liberalised. Retail prices, including those beyond Dar es Salaam, reflect competitive pressures at all links in the supply and delivery chain.

Table A10.4 gives an indication of combined OMC and retail margins based on early September, 2008 conditions. Despite the generally favourable price efficiency factors margins are much higher than Kenya's. For premium gasoline the OMC/retail margin was US¢ 28/liter, for illuminating kerosene it was US¢ 17/liter, for diesel/gasoil it was US¢ 18/liter. Possibly the explanation lies in the need for OMCs to work through more expensive inventory; but this could also apply to Kenya.

Starting at the top of Table A10.4, landed costs for all three products are judged to be efficient due to the number and diversity of importers as discussed above. Nor do duties and taxes distort efficiency except for illuminating kerosene. Its retail price is only about two-thirds that of diesel (945 TShg/liter vs. 1410 TShg/liter) as a result of lower taxes and almost certainly result in the illegal blending of IK into diesel/gasoil. Either the IK fuel levy or the excise duty should be raised so that they are more closely aligned with diesel taxes.

Logistics costs also appear efficient. While demurrage charges may be high, terminal costs in Dar es Salaam are reasonable and have come down in the past few years. Nor do product specifications have any impact on final prices; they are understood to be the same as those in Kenya and are readily available in the international market.

Except for concerns over the large number of participants and the enforcement problems which arise from this, and despite the apparently high OMC/retail margins, Tanzania's retail products' pricing may be the most efficient of the seven E & SA study countries. It would be discouraging if they move to joint product purchasing.

[39] For security of supply reasons only; it is considerably less expensive for Rwanda to secure products via Kenya.

[40] It proved difficult to obtain domestic demand figures for earlier years as requested in the TOR.

4.2 For jet fuel and fuel oil

As in Kenya, no specific data on the pricing efficiency of these two price sensitive products was obtained. However, the same fuel oil issues exist as in Kenya: end-users, especially mines in North-western Tanzania, have a choice between using:

- heavier higher viscosity 380 cSt fuel oil which is less expensive at source, but more costly to transport by sea and land and more costly to store because it requires heating;

AND

- lighter lower viscosity 180 cSt fuel which costs more at source but has lower logistics and handling costs.

As previously noted, end-users are continually evaluating these differences to select the most efficient delivered cost of fuel.

Table A10.4: Indicative Retail Price Buildup in Dares Salaam
As of December, 2008 in Tanzania Shillings and US cents per litre

		Notes		93 RON UNL			Illuminating kero			Gasoil / diesel 0.5 %S		
1	**International FOB reference price (Platts)**											
	Based on Nov average in US$/Tn	1	US$/Tn	425			615			543		
	Freight, insurance and premium in US$/Tn	2	" " "	50			27			50		
2	**CIF Dar price in US$/Tn**		" " "	475			642			593		
	Additional costs payable in US$											
	Wharfage @ 1.6 % of CIF	3	" " "	7.6			10.3			9.5		
	Inspection @ 1.2 % of FOB	3	" " "	5.1			7.4			6.5		
	"SUMATRA" @ US$ 0.25/Tn	3	" " "	0.3			0.3			0.3		
	TBS @ 0.2 % of CIF	3	" " "	1.0			1.3			1.2		
	TIPIR fees @ US$ 0.15/Tn	3	" " "	0.2			0.2			0.2		
	Marine transit losses @ 0.5 % of CIF	3	" " "	2.4			3.2			3.0		
	Demurrage (estimate) @ US$ 3/Tn	3	" " "	3.0			3.0			3.0		
	Finance costs (est ?) @ US$ 1.50/Tn	3	" " "	1.5			1.5			1.5		
	Sub-total additional US$ costs/Tn : Oct '08		" " "	21			27			25		
3	**In-bond landed cost in US$/Tn**		" " "	496			669			618		
	Conversion M3/Tn (EWURA)			1.36			1.27			1.20		
	in US$/m^3		US$/M3	365			526			515		
	Mid-November 2008 exch rate in T Shg/US$	4	TShg/US$	1 252			1 252			1 252		
				T Shg/L	**US ¢/L**	**%**	**T Shg/L**	**US ¢/L**	**%**	**T Shg/L**	**US ¢/L**	**%**
	In-bond landed cost in T Shg and US ¢ /L			457	36.5	33%	659	52.6	70%	645	51.5	46%
4	**Government take + EWURA levy**											
	Fuel levy			200	16.0		0	0.0		200	16.0	
	Excise duty			339	27.1		52	4.2		314	25.1	
	EWURA levy			6.1	0.5		7.1	0.6		6.8	0.5	
	Sub-total taxes and levies	3		545	43.5	40%	59	4.7	6%	521	41.6	37%
	Tax paid cost to Dar es Salaam			1 002	80.0	73%	718	57.3	76%	1 166	93.1	83%
5	**Local depot and transport costs to end-users**											
	Depot cost @ US$ 7.50/m^3	1		9	0.8		9	0.8		9	0.8	
	Local transport	1, 5		10	0.8		10	0.8		10	0.8	
	Sub-total			19	1.5	1%	19	1.5	2%	19	1.5	1%
	Tax paid cost to end-users in Dar es Salaam			1 022	81.6	75%	737	58.9	78%	1 185	94.7	84%
6	**Calculated OMC and dealer margin**			348	27.8	25%	208	16.6	22%	225	18.0	16%
	Estimated Dar pump prices in December	6		**1 370**	**109.4**	**100%**	**945**	**75.5**	**100%**	**1 410**	**112.6**	**100%**

Notes:

(1) From industry sources.

(2) Difference between FOB and CIF prices for the month of October, 2008 from EWURA Public Notice PPN/13/08; www.ewura.go.tz / public notices / petroleum.

(3) From EWURA source "A" ; see sources below.

(4) Www.bot-tz.org / financial markets / previous exchange rates / July 2000 to Nov. 2002 / indicative forex market rates / Nov. 14th, 2008.

(5) Called "Distribution margin (30 km)" in Source "B"

(6) Estimated by Consultant based on EWURA prices for Dar es Salaam for October, 2008 and early February, 2009.

Sources:

A Primary source is Pump Price Computation - "Current" (Sept. 2007), undated EWURA Discussion Paper given to Consultant in Nov 2008.

B Secondary source is: Public Notice on Petroleum Business … for Sept., 2008, pursuant to EWURA Order # 07-010, undated.

The former is more detailed while the latter is more current. Therefore the more current values were inserted in the 2007 framework.

Recommendations

- Reconsider a possible move to joint purchases of oil products;
- Improve the efficiency of the Port of Dar es Salaam:
  - Re-instate the overhead loading arms and by-pass the flow meters; improve inspection of the tank dips, both on the vessel and on-shore. After all, in addition to the TRA, in attendance are:
    - The vendor of the oil or his representative;
    - The OMC buying the oil or his representative;
    - The ship's officers.
- Consider out-sourcing the operations of the Port:
- Improve the enforcement of regulations and inspections;
- Institute more stringent OMC licensing criteria;
- Consider halving the EWURA fee now collected (between 6 TShg/liter and 7 TShg/liter) and raising the balance by means of an annual OMC licence fee. This would put more of a relative burden on the smaller companies who almost certainly cause the most "regulatory headaches".

Table A10.5: Terminals in Dares Salaam by company and product as of Sept, 2007

COMPANY	TANKAGE CAPACITIES BY PRODUCT (MT)									Approx conversion at 1.2 m^3/Tn	
	AVGAS	LPG	MSP	JET A1	IK	AGO	IDO	FO	TOTAL	1.2	
									tonnes	10^3 m^3	
TIPER [1]	-	960	12,100	4,400	4,400	42,100	3,360	24,500	91,820	110	123.2
BPT	1,005	302	2,486	9,388	3,183	14,949	1,105	9,449	41,868	50	
ENGEN	0	-	5,058	-	3,302	7,356	-		15,716	19	
GAPOIL	-	-	3,251	-	1,855	19,312	275	3,080	27,773	33	
GAPCO	-	-	5,288	2,307	2,574	9,000	-	833	20,002	24	
OIL COM	-	-	4,415	4,717	4,717	15,000	-	5,639	34,488	41	
ORYX	-	1,050	5,080	0	804	9,246	245	4,800	21,225	25	
NATOIL	-	-	2,208	-	4,717	5,833	-		12,758	15	
TOTAL	-	-	6,442	2,296	-	7,646	-	6,698	23,081	28	
MGS [2]			8,830		6,289	13,333			28,452	34	
CAMEL OIL [2]			4,415		9,434	15,000			28,849	35	
GBP [2]			6,623		7,075	15,000			28,698	34	
WORLD OIL - KIGAMBONI [2]			7,358		3,931	8,333			19,623	24	
DAR TOTAL [3]	**1,005**	**2,312**	**66,196**	**23,108**	**48,350**	**173,775**	**4,985**	**55,000**	**394,353**	**473**	**486**

Notes :

1. TIPER's total has been adjusted up from 110 000 m^3 to 123 000 m^3 as of Nov. 2008 based on Consultant's visit to the terminal.
2. Under construction as of Sept. 2007.
3. Excluding a small gasoil only bunkering depot at Chang'ombe.

Source : EWURA; given to Consultant during field visit, mid-November, 2008.

Annex 11 Uganda

Uganda was one of the first countries in SSA to liberalise its oil prices. Since then (1994) the government has confined itself to regulatory oversight. With the minor exception of the Jinja oil terminal, it has no operational role in the downstream oil sector.

Uganda's logistics are marginal and there are impediments to pricing efficiency in both the marketing and institutional areas. As a result, indicative combined December, 2008 OMC and dealer margins in Uganda are very high, compared to all other E & SA countries within the study. However, as well as sharply dropping international prices, there were supply disruptions in Kenya causing shortages in Uganda which could partially explain these.

1. Legal, Regulatory, Institutional Framework – Sector Organization

1.1. Introduction

Oversight of Uganda's oil sector is vested with the Commissioner of Petroleum within the Ministry of Energy and Minerals Development (MEMD). There is no separate regulatory authority

Uganda's institutional framework works against lower end-user costs. Uganda does not have the resources and the MEMD bureaucracy may lack the stature to enforce regulations.

1.2. Legal/Regulatory Framework

A vital oversight role in a liberalised market is the monitoring, and publishing, of basic information relating to the operation of the sub-sector, especially indicative price data, such as is done in Tanzania. Uganda's MEMD simply lacks the resources to carry out this function.

A positive factor however, is the absence of government's operational involvement in the Sector. (Except for the 30 000 m^3 Jinja storage facility which it leases out[41] -- although it has been criticised in the press for so doing[42]).

Table A11.1 summarises the key regulatory features of Uganda's downstream oil industry which impact upon pricing efficiency. Except for inadequate OMC licence criteria, the basic regulations are good but Uganda lacks the resources to implement and enforce them.

A positive regulatory feature is the collection of a single excise tax at the border and the marking of duty-paid product. The Uganda Bureau of

Table A11.1: Key Regulatory Features of Uganda

End-user pricing basis	Liberalised in 1994
If controlled, price changes are :	n.a.
Primary governing legislation	Pet Act Cap 97
Economic regulator	Pet Commissioner (1)
Effectivness / "resources"	Inadequate
Primary governing legislation	Part II, Pet Sup Act (#13), 2003
Price management / monitoring	Very limited
Economic operator licensing criteria	Part IV, Pet Supply Act
Fair trading	Part VII, Pet Supply Act
Contingency stocks	Parts V & IX, Pet Supply Act
Technical oversight	Pet Commissioner (1)
Effectivness / "resources"	Inadequate
Primary governing legislation	(see economic reg)
Infrastructure & operating standards	Part IV, Pet Supply Act
Product qualities	Part VIII, Pet Supply Act
Subjective assessment of enforcement	Weak
Note :	
(1)The Petroleum Commissioner reports to the Minister, MEWD.	
Source : Consultant interviews and correspondence with MEWD and industry mid-Nov 2008. Also www for legislation.	

[41] Conflicting information was received. The Gov't may loan out products stored in the facility to be repaid at a later date.

[42] East African Standard, 7 January, 2009. Shortages Expose Hole in Oil Reserve.

Standards (UBS) and the Ministry reportedly do check retail outlets to ensure duty has been paid.

1.3. Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled

Since privatisation in the mid-1990s the government has had essentially no ownership or operational role in Uganda's downstream oil sector. The single exception is the government's ownership of the Jinja Oil Storage Facility, some 90 km east of Kampala, which it leases out to OMCs

Private Sector

As indicated by Figure A11.2, Uganda has some 40 OMCs (some estimates put it at "over 60"). The largest two operators, the local affiliates of multinationals, Shell and Total now control almost 60% of the market.

The HHI for the total market is estimated at 1831.

This market structure is likely one cause of its apparently very high margins.

Table A11.2: Indicative Uganda Market Share by Company

Company	Percent	HHI (1)
Shell (2)	33	1,089
Total	14	196
Chevron	12	144
Sub-tot Total / Chevron (2)	26	676
Sub-total Shell and Total / Chevron	59	1,765
Petro	6	36
Kobil	4	16
Gapco	3	9
Engen	2	4
Sub-total top six companies	74	1,830
Remaining approx 35 OMCs (3)	26	1
Total	**100**	**1,831** (4)

Notes :

1 HHI : Hirfendahl-Hirschman Index; the sum of the squares of individual market shares, a common measure of market concentration

2 Shell was ranked first until the November, 2008 acquisition of Chevron by Total.

3 An average market share of < 1 % was assumed.

4 Without the above acquisition the HHI would have been 1 490.

Source : Industry sources in Kampala, Nov. 10th, 2008.

2. Supply, Procurement Arrangements and Infrastructure

Table A11.3 and the East African logistics' map shown previously, indicate Uganda's oil logistics infrastructure is brittle. Kampala, the main consuming center, is some:

- 1,400 km from the Port of Mombasa, and 425 km from the KPC terminal at Eldoret;
- 90 km from Jinja and 300 km from the Kenyan border;
- 1,100 km from Dar es Salaam to Mwanza on Lake Victoria, plus the Lake crossing.

Table A11.3: Summary of Uganda's Oil Logistics Infrastructure

Primary Supply Sources (typical)			KPRL, Middle East
	Joint purchases		No
Primary port for product imports			Mombasa, Kurmani
	Indicative max. cargo size	10^3 dwt	~ 80
Secondary port for product imports			Dar es Salaam
	Indicative max. cargo size	10^3 dwt	~ 45
Oil storage terminals at primary port		Number	2
	Approximate capacity	10^3m^3	> 350
	In terms of days consumption (total 2007)	# of days	n.a.
	Third party access		Yes, Kurmani
Primary transport mode to main consuming centres			KPC to Eldoret then road
	Current transport capacity		Good with P/L exp.
	Third party access		Yes
Main consuming centre			Kampala
	Oil storage terminals at main centre (1)	Number	4 or 5
	Approximate capacity	10^3m^3	< 20
	Third party access		Fair

(1) Uganda's largest storage facility is the government's 30 10^3m^3 terminal at Jinja.

Sources :

Consultant interviews with industry and Kenya's logistics table.

The only realistic corridor in the short term is from Mombasa via pipeline to Eldoret and onwards to Kampala by road but even this has difficulties. There are transit-related customs costs and delays, the Kenya pipeline is at capacity, the railroads almost un-operational, road haulers did not adjust to an October, 2008 requirement to reduce their carrying capacity and the road from the Kenya border to Kampala is extremely congested.

Transit-related customs costs and delays, both in Mombasa and at the Kenya- Uganda border, add to logistics-related price inefficiencies. Recently, to minimise illegal selling of in-bond transit products, Kenya obliged transporters to:

- Post a KShg 10 million (approx US$ 140,000 @ 72 KShg/US$) bond in Mombasa which would be refunded upon proof of cargo exit at the Uganda border[43];
- Obtain a company transporters transit license at a cost of approx US$ 1,500;
- Pay a transit goods fee of approx US$ 600[44].

The above, together with delays at the Kenya - Uganda border are additional costs directly passed on to end-users. These additional costs are the result of too many OMCs (both in Kenya and Uganda) often using sub-standard road haulers and lax enforcement of regulations, such as motor vehicle and driver standards.

Another logistics inefficiency is the delay in doubling the capacity of the KPC between Mombasa and Nairobi. This was due to be completed mid-November, 2008 but has been delayed.[45] Until it is completed, truckers have to haul products all the way from Mombasa to Kampala, adding almost 1,000 km and US$ 50/m^3 to the OMC costs[46]. Another negative (which should have been foreseen by truckers operating into Uganda) was the mid-October, 2008 obligation to reduce load capacities by approximately 25%. Kenya had imposed this restriction earlier, as have all other E & SA countries within the study.

There are firm plans to expand the KPC capacity up to Eldoret by 2011 and, the hope that a new pipeline can extend beyond to Kampala and, possibly into Rwanda. Such expansions will reduce not only transit costs but road degradation, accidents, traffic congestion and fraud.

Rail ought to be a less expensive option than road transport. However, the Rift Valley RR and the Tanzania Railway Corp., both of which have taken oven from state-owned railways, have a long way to go to become competitive alternatives. And, unfortunately there are, as yet no block-train rates for oil products on the Rift Valley RR. Thus present rates are almost the same as for road transport.

Depot storage capacity within Uganda is inadequate. With less than 20 000 m^3 in Kampala and 30 000 m^3 at Jinja the entire country only has about 20 days of storage capacity. It has long been intended that construction of the Kenya-Uganda pipeline, whose design includes a substantial storage terminal near Kampala, would overcome this bottleneck. Unfortunately there have been continual delays in its construction leaving Uganda in an exposed position.

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[43] BBC Monitoring Africa, Dec 30th, 2008.

[44] Article dated March 10th, 2008 via the World Bank, Nairobi. Probably from the East African Standard.

[45] Per articles in Websites http://allafrica.com/stories/200907131476.html July 13, 2009, and http://www.eastandard.net/InsidePage.php?id=1144017533&cid=4&ttl=Sh6%20billion%20lost%20in%20Kenya%20Pipeline%20scam, The"Mombasa-Nairobi Oil Pipeline Capacity Enhancement Project" has not been properly commissioned and is bogged down by technical, management, financial and corruption problems.

[46] The KPC cost for exports is about US$ 5.25 / M3 / 100 km ; the road transport cost is > US$ 10 / M3 / 100 km – refer to Section 3.34 of Chapter 3.

Shipment of 380 cSt fuel oil, which must be heated, may, however, be attractive by rail. Consumers, including power plants near Kampala and mines in Western Tanzania, are working with transporters and OMCs to minimise supply costs.

A final logistics penalty for Uganda adding to price inefficiency is the poor condition and congestion of the road from the Kenya border to Jinja. It is being slowly improved but its current state simply adds to costs.

In the medium term, the expected start of oil production in Uganda will affect its fuel supply logistics, although whether crude oil will be exported and refined products will continue to be imported or whether Uganda will have domestic refining capacity is being discussed. According to the government, one option is the proposal by Italy's Eni, which is looking into the feasibility of constructing a 100,000 bpd refinery in Uganda. The refinery would be connected to a new export pipeline to Mombasa (*BMI Daily Oil and Gas Alert* 2009).

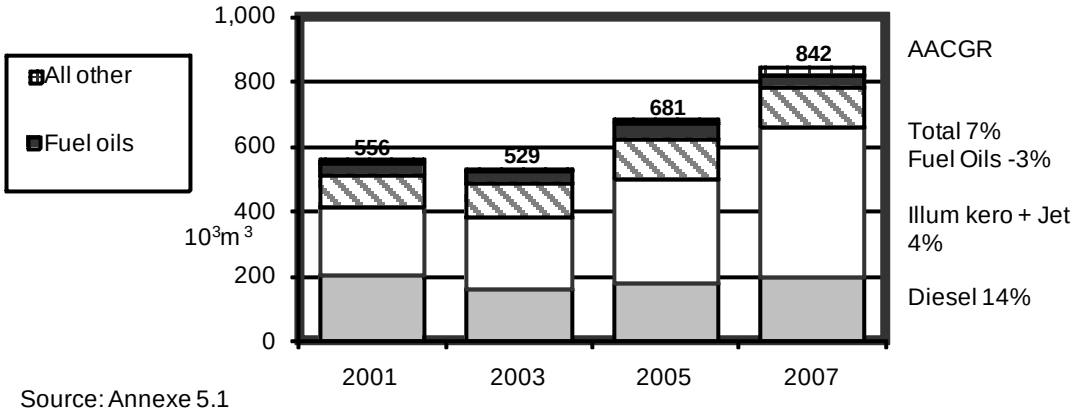
3. Market

Uganda has a comparatively small domestic market of approximately 840 000 m^3 as indicated in Figure A11.1 and Table A16.5. Nonetheless, it does enjoy synergies with its neighbours, both Kenya and further inland, so that this level of demand is not an impediment to market efficiency. The market shares by product are 55% for diesel, almost 25% for motor gasoline (PMS) and 11% for Jet A-1. The remaining 10% is spread amongst kerosene, fuel oil, LPG and "all others".

The composition of demand is becoming more heavily skewed towards jet fuel and gasoil.

Figure A11.1:

Uganda Annual Sales Figures in thousands of cubic meters



Source: Annexe 5.1

However recent sharp increases in demand for both products has been caused by regional conflicts to the west and north (jet)[47] and low water levels reducing hydro power production(hence increasing demand for diesel-powered generation). Demand for the other three main products has either remained stable or decreased. The situation could change somewhat in the future. Gasoil for power generation is being replaced by fuel oil. (As in Kenya and Tanzania,

[47] The UN has a large logistics base adjacent to Entebbe airport.

large consumers are assessing the trade-off between fuel and transport costs of different qualities of fuel oil.)

Another factor potentially changing future demand patterns is the possibility of building a mini-refinery to process recent commercial discoveries of crude oil along the western edge of Uganda. Longer term there is the hope that the discoveries will prove substantial thus opening up new oil supply options. The MEMD is gearing up to study these issues.

4. Pricing & Taxation

4.1. For the retail products: gasolines, illuminating kerosene and gasoil/diesel

Uganda's downstream oil sector, like that of Tanzania, is completely liberalised. Retail prices, in and beyond Kampala reflect costs at all links in the supply and delivery chain, competition and the regulatory climate.

Table A11.4 gives an indication of combined OMC and retail margins based on (unfortunately, and probably unrepresentative) turbulent December, 2008 conditions. They were about 55 US ¢/liter, well above those of any other E & SA country within the study, about triple those of Kenya and almost 2.5 times those of Tanzania. (East Africa easily had the highest margins of the E & SA countries studied.)

Uganda's landed costs in Mombasa are the same as used in Kenya and are quite efficient for the reasons given in Annex XIII. Nor are, duties and taxes distorting gasoline or diesel price efficiency.

Logistics costs do, however, penalise Uganda. Likewise the large number of market participants and the potential for market dominance by the two largest OMCs very likely result in OMC margins being higher than they would otherwise be because of inadequate regulatory enforcement. (Product specifications have no impact; Uganda accepts Kenya's product qualities.)

4.2 For jet fuel and fuel oil

As in the other countries, no data on the pricing efficiency of these two price sensitive products was obtained. For fuel oil the same issues exists as in Kenya and Tanzania; should consumers use less expensive, (but more costly to transport because of heating) 380 cSt fuel, or 180 cSt fuel. Again, end-users are continually evaluating these differences to select the most efficient delivered cost of fuel. Most importantly, they have the options, in terms of suppliers and transporters, to do so.

Recommendations

- Seek ways to fund the MEMD such that it is in a better position to fulfill its mandate:
  - As a start, impose substantial license fees on OMCs which would fund the MEMD. This would also eliminate the non-serious companies and greatly reduce the oversight burden of the MEMD. For example Madagascar applies very high (US$ 180,000) OMC licence fees.
- Enforce existing regulations which oblige a minimum of ten days of stocks be held by the OMCs;

- Improve criteria for licensing OMCs and then ensure their enforcement;
- Collect and publish as much data as possible concerning the sector and how it operates, especially as regards prices and costs;

Table A11.4: Approximate Retail Price Buildup in Kampala
December, 2008 in Uganda Shillings and US cents per litre

		Notes		93 RON UNL			Illuminating kero			Gasoil
1	**In-bond landed cost**									
	Based on previous month in US$/Tn	1	US$/Tn	527			631			563
	Conversion M3/Tn		m^3/Tn	1.37			1.26			1.18
			US$/$m^3$	384			499			477
	Exch rate for previous month in UShg/US$	2		1,904			1,904			1,904
				UShg/L	**US ¢/L**	**%**	**UShg/L**	**US ¢/L**	**%**	**UShg/L**
	IBLC expressed in U Shg and US ¢/L		Ushg/L	**730**	**38.4**	**25%**	**950**	**49.9**	**39%**	**908**
2	**Coastal storage and refinery handicap @ 5 % IBLC**									
	Refinery handicap @ 5% of landed cost	1		37	1.9		48	2.5		45
	KOSF fee @ US$ 3/M3 + 16% VAT	3		7	0.3		7	0.3		7
	Total Cost ex Kenya Oil Storage Facility			773	40.6	27%	1,005	52.8	41%	960
3	**Transport cost from Mombasa to Kampala**									
	P/L tariff (for exports) to Eldoret excl VAT	4		76	4.0		76	4.0		76
	Road delivery cost from Eldoret to Kampala	5		109	5.7		109	5.7		109
	P/L, Eldoret terminal & road transp. losses									
	as % of ex-KOSF cost @ 0.8 %	5		6	0.3		8	0.4		8
	Ins and finan on mvmts: KOSF to Kamp @ 0.6 %	5		5	0.2		6	0.3		6
	Sub-total transport costs: KOSF to Kampala			196	10.3	7%	199	10.4	8%	198
	Ex-tax cost delivered to Kampala terminals			**969**	**50.9**	**33%**	**1,203**	**63.2**	**49%**	**1,159**
4	**Excise tax paid at Uganda border**	6		870	45.7	30%	200	10.5	8%	530
	Tax paid cost to Kampala			**1,839**	**96.6**	**63%**	**1,403**	**73.7**	**57%**	**1,689**
5	**Indicative local depot and transport costs to end-users**									
	Kampala depot cost	5		14	0.8	0%	14	0.8	1%	14
	Local transport	5		5	0.3	0%	5	0.3	0%	5
6	**Calculated OMC margin incl. stabilisation**	7		992	52.1	34%	977	51.3	40%	992
7	**Indicative retail dealer margin**	6		50	2.6	2%	50	2.6	2%	50
8	**Approx. Kampala pump prices in early Dec**	8		**2,900**	**152.3**	**100%**	**2,450**	**128.7**	**100%**	**2,750**
	Combined OMC/dealer margin			**1,042**	**54.7**	**36%**	**1,027**	**53.9**	**42%**	**1,042**

Notes:

(1) From Kenya price build-up, Table 3.5.

(2) November average US$ buying rate. Www.bou.or.ug / exchange rates / rates and statistics / monthly averages.

(3) The KPC fee is based on a document provided to the Consultant by e-mail by the MoE on Dec. 10th, 2009.

(4) Provided by the ERC by e-file to the Consultant during his mid-November, 2008 field visit.

(5) Consultant's estimate based on typical costs provided by the oil industry to the Consultant during his mid-November, 2008 field visit.

(6) Provided by the Commissioner of Energy, MEMD to the Consultant during his mid-November, 2008 field visit.

(7) Calculated by difference; Kampala pump prices less: retail margins, local transport, Kampala depot costs and the tax paid cost to Kamp

(8) Provided by the Commissioner of Energy, MEMD, by e-mail, March 5th, 2009.

- Resist short term political pressure to change the mode of operating the Jinja storage facility:
  - Provide decision-makers with a brief explaining why the current approach is the most suitable, given Uganda's means;
  - Ensure the facility is fully used;
  - Avoid having a single lessee control the entire 30 000 m^3.
- Continue to support efforts to advance the Kenya : Uganda pipeline (K-U pipeline) and improve the Rift Valley RR line:
  - Once the K-U pipeline is a definite "go", the RoW defined, and the detailed engineering work completed, consider pre-building the proposed new storage terminal near (West of) Kampala. Uganda needs additional storage capacity.

Table A11.5: Uganda demand by product any year in cubic meters

	Premium	Kero	Jet A-1	Gasoil	Fuel Oil	LPG	Subtotal	Bitumen	Lubes	IDO	Others	Total
2000	190,462	56,163	40,212	187,276	36,087	3,082	513,282		5,127			518,409
2001	200,021	55,539	43,915	207,236	38,591	2,892	548,194		5,127	3,146		556,467
2002	203,533	91,027	40,270	195,366	32,391	3,116	565,703					565,703
2003	155,173	40,697	66,974	220,096	41,889	3,805	528,634					528,634
2004	186,285	49,340	79,131	260,978	53,313	4,500	633,547					633,547
2005	174,054	39,836	88,932	319,574	44,423	4,488	671,307	3,058	6,805	10	69	681,249
2006	198,125	42,897	89,995	417,449	38,289	5,800	792,555	3,016	7,440	0	56	803,067
2007	191,713	34,309	92,616	464,122	34,384	7,273	824,417	9,277	8,493	0	80	842,267
07 in %	23%	4%	11%	55%	4%	1%	98%	1%	1%	0%	0%	100%
AACGR												
00 to '07	0%	-7%	13%	14%	-1%	13%	7%					7%
Source :	Uganda's MEMD, given to Consultant during Mission Nov. 2008.											

Annex 12 South Africa

South Africa is in a league by itself within the seven E & SA countries studied. It rates more favourably on all of the efficiency determinants than any of the others. But end-user prices could be lower, as it is the one country in SSA which should be able to achieve the greatest price efficiency through liberalisation and competition. Yet it has price controls and product imports are strictly limited. The State is heavily involved at all levels of the industry and many normally non-confidential operational parameters are shrouded in secrecy.

OMC gasoline and diesel margins (excluding retail/ dealer margins but including deemed coastal storage and stock financing costs) in South Africa, at 5.1 US¢ /liter, seem reasonable relative to other E&SA countries but they possibly could be lower. On the other hand, retail margins, for employment policy reason, are a high 6.3 US¢/liter.

1. Legal, Regulatory, Institutional Framework – Sector Organization

1.1. Introduction

South Africa's institutional framework favours efficient pricing with one exception: the government's considerable operational involvement at all links in the supply and marketing chain. Otherwise, South Africa has the population, wealth and level of governance /democratic maturity required for efficient markets.

1.2. Legal, Regulatory Framework

Table A12.1 summarises South Africa's regulatory context as regards the downstream oil sector and retail product pricing efficiency. As noted below, it has, and strictly complies with, very detailed price controls.

Table A12.1: Key Regulatory Features of South Africa

End-user pricing basis		Controlled
	If controlled, price changes are :	Monthly
	Primary governing legislation	Pet Prod Amendment Act of 2006
Economic regulator		NERSA(1) & DME
	Effectiveness / "resources"	High
	Primary governing legislation	As above and NERA Act 40 of 2004
	Price management / monitoring	Very Good
	Economic operator licensing criteria	Pet Prod Amendment Act N° 58 of '04 Sec 2B(1)
	Fair trading	Good
	Contingency stocks	Unknown
Technical oversight		DME
	Effectiveness / "resources"	Unknown
	Primary governing legislation	Pet Prod Amendment Act of 2006
	Infrastructure & operating standards	Assumed good
	Product qualities	Good
Subjective assessment of enforcement		Very good

Notes :

(1) The National Energy Regulator's only role in the petroleum sub-sector is for pipelines, including technical standards and tariffs.

Source : Interviews with DME and industry, late 2008.

South Africa is the only E & SA country studied to have a truly independent regulator. The independence of National Energy Regulator of South Africa (NERSA). has been demonstrated by articles in the press in 2008 reporting heated debate between it and the government over pipeline licensing. However, NERSA's role in the downstream oil sector is confined to oil product pipelines, including technical standards and the setting of pipeline tariffs. Otherwise the Department of Minerals and Energy (DME) is responsible for the downstream oil sector and management of the price structure. (In regard to the latter, the DME is obliged to include NERSA's pipeline tariffs in the overall price structure.)

Other regulatory aspects are either unknown, or judged to be good in their effectiveness as indicated in Table 16.1. With regard to product specifications South Africa has a range of gasoline and diesel product qualities well adapted to the country's refinery capabilities,

geography, range of vehicle types, and environmental aspirations. The Consultant has no reason to question any negative impact on price efficiency. Indeed, having the ability to use lower octane gasoline at the higher inland altitudes contributes to pricing efficiency.

1.3. Institutions Specific to the Hydrocarbons Sector

State-Owned or Controlled

The State owns, through Transnet and the Central Energy Fund:

- All the ports;
- Two refineries (only 64% of the second, Natref), with a third planned near Port Elizabeth by PetroSA;
- The Transnet pipeline;
- The rail freight system – Transnet Rail Freight;
- Two marketing companies: Sasol and PetroSA.

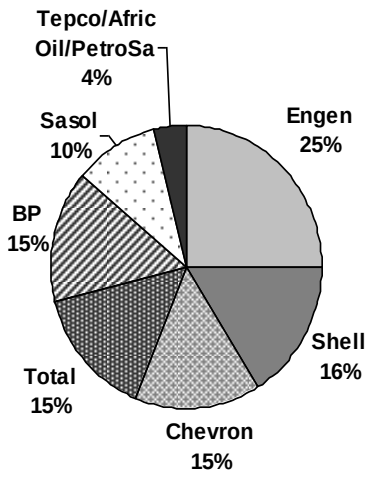
The above involvement raises the question of whether the government is serving the citizens at the lowest possible cost (consistent with high standards) or ensuring that its various operating companies are profitable.

The State, through the Central Energy Fund, is also responsible for strategic storage and strategic stocks, a legitimate government function.

Private Sector

In sharp contrast to the three East African countries, there are only nine OMCs operating in South Africa and three have negligible market impact. Indeed, the HHI of 1,700 (refer to Figure A12.1) indicates the market, while not overly concentrated, suggests there is the possibility of a "comfortable" cartel given the role played by State enterprises.

Figure A12.1: South Africa Market Shares by Company



While the refinery and OMC's logistics margins are set by the Department of Minerals and Energy (DME) they are the result of negotiations with the industry over many years and based on the policy that, (in addition to Black Empowerment rules): *a)* the country will be self-sufficient in refinery capacity and *b)* that OMC margins will be based on an (South African) industry average return of 15% as described in Section 5.

Table A12.2: South African Refinery Capacity							
Refinery	Ownership	Location	Capacity			As of end	Sources
			10^3b / sd		10^6 tpa (1)		
Sapref	50 % Shell Energy SA, 50 % BP Southern Africa	Durban	194		8.5	2007	www.sapref.com / About SAPREF / Profile
Enref	Engen South Africa	Durban	125		5.5	2006	SAPIA '06 Annual Report
Chevref	Chevron	Cape Town	100		4.4	" "	" " " "
Natref	36% Total ; 64 % SASOL	Coalbrook	108		4.7	" "	www.natref.com & SAPIA
		(nr. Sasolburg)					06 Annual Report
SASOL	SASOL	Secunda	150	(2)	6.6	" "	SAPIA '06 Annual Report
Petro SA	Petroleum Oil & Gas Corp of South Africa (Pty)	Mossel Bay	45	(2)	2.0	" "	" " " "
Total			**722**		**32**		
Notes :							
1	Converted from 10^3 barrels per stream day to 10^6 tpa assuming 90% operating days per year and 7.5 bbls						
	crude per tonne.						
2	Crude equivalent capacity as per SAPIA '06 Annual Report. WWW.sapia.co.za / publications.						

2. Supply, Procurement Arrangements and Infrastructure

2.1. Refining and Product Supply

Essentially all of South Africa's demand is met from the country's six refineries. Table A12.2 shows that they have a total capacity of some 32 million m^3 per year compared with total demand of 25.5 million m^3. Indeed to optimise refinery production the OMCs import about 5% of demand concurrently exporting products, especially diesel, to the sub-region.

A seventh, very large refinery is planned by PetroSA, the State's second "national oil company" near Port Elizabeth in the eastern Cape Province. Design capacity, at 17.6 m tpa (400 k b/sd) will be double that of the next largest refinery in South Africa. It is expected to be onstream by 2015.[48]

2.2. Logistics

South Africa's oil delivery infrastructure favours price efficiency in an overall sense. However, there are constraints. Figure 16.2 shows the key petroleum products logistics infrastructure in the eastern and central part of South Africa. (Demand in the rest of the country is confined primarily to the Coast and is well served by an extensive network of:

- Two refineries (Cape Town and Mossel Bay);
- Four secondary marine terminals[49] along the coast;
- An unknown number of inland depots;
- A "fair" rail network; and
- An excellent road system.

[48] www.petrosa.co.za / media releases / 11 December 2008.

[49] East London, Port Elizabeth, Mossel Bay and Cape Town.

Table A12.3 highlights some weak links in South Africa's logistics infrastructure. Durban, South Africa's primary oil supply port, is limited to refined products vessels not exceeding 45 to 50 k tonnes; not particularly large compared to the size of the market. Moreover it is relatively congested and expansion will not be easy. (Crude oil is discharged by means of an offshore SBM.)

Table A12.3: Summary of South Africa's Key Oil Logistics Infrasture

Primary Supply Sources (typical)			SA refineries
	Joint purchases		No
Primary port for product imports			Durban
	Indicative max. cargo size	10^3 dwt	45 to 50
Secondary port for product imports			n.a.
	Indicative max. cargo size	10^3 dwt	n.a.
Oil storage terminals at primary port		Number	4 or 5
	Approximate capacity	10^3m^3	Unknown
	In terms of days consumption (total 2007)	# of days	n.a.
	Third party access (1)		Quid pro quo
Primary transport mode to main consuming centres			Transnet P/L
	Current transport capacity		Constrained
	Third party access		Yes
Main consuming centre			Gauteng
	Oil storage terminals at main centre	Number	Unknown
	Approximate capacity	10^3m^3	Unknown
	Third party access		Quid pro quo

Sources: Consultant interviews with industry and previous assignments.

Refined product storage at the Port is available at:

- Each of the two refineries;
- The Transnet pipeline system;
- Two independent oil and chemical storage terminals:
  - Vopak
  - Island View Storage.

Storage capacities are "secret" but known to be tight. There is no reasonable capacity available to third parties at either Vopak or Island View. It certainly is not at the other three. Moreover, Vopak advised [50] they had been trying in vain for several years to get planning permission to expand. In any case, only licensed OMCs are entitled to import products. It is understood new participants are not encouraged unless they qualify under "Black Empowerment" rules.

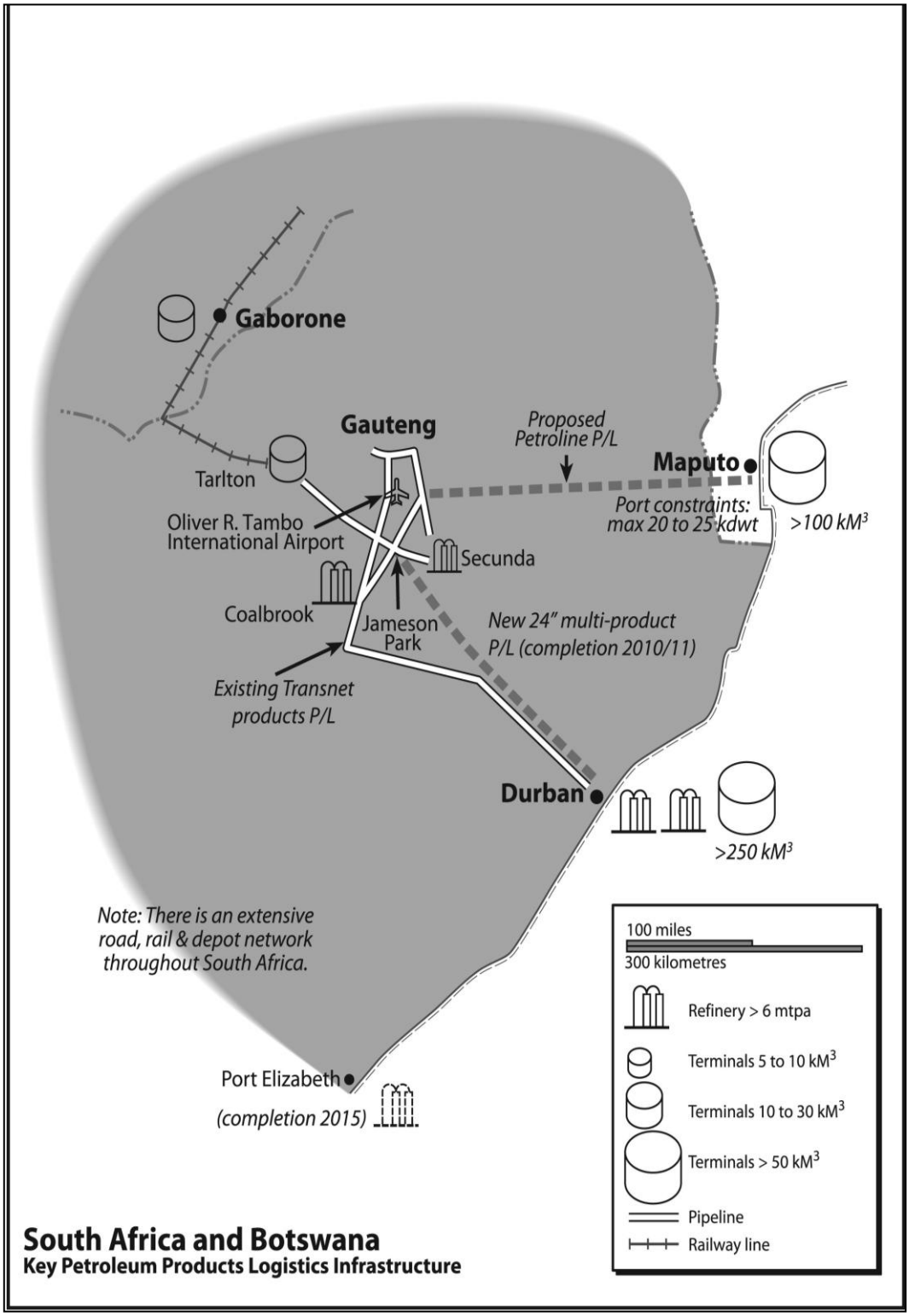
Another impediment to price efficiency is a temporary capacity constraint (before Coalbrook) on the Transnet pipeline from Durban to South Africa's industrial heartland, Gauteng. This is being addressed, as Transnet is building a new 24" multi-product pipeline directly from Durban to a junction point near Jameson Park.

Rail and road tanker movements from Durban inland are options to the pipeline but are more expensive in addition to having other drawbacks (especially road transport). As long as the constraint exists the DME has authorised higher incremental rail rates be integrated into the Service Differential (refer to Section 5).

[50] By a telecommunication with the Consultant Nov. 21st, 2008.

Intermodal rail and road rates are highly competitive and it proved impossible to obtain actual rates

Figure A12.2: South Africa and Botswana Key Petroleum Product Logistics Infrastructure



(which must not be confused with those approved by the DME for inclusion in the Service Differential; the former are what the OMCs pay, the latter are what they are re-imbursed). In any case their use is very secondary relative to the pipeline where the pipeline network exists.

Until recently the government has neglected the shipment of oil products on the state-owned rail network (Transnet Rail Freight). For example it apparently does not offer block train rates or the priority service which goes with them. Hence even while rail rates may be competitive, their service levels are not up to those of the private sector trucking firms.

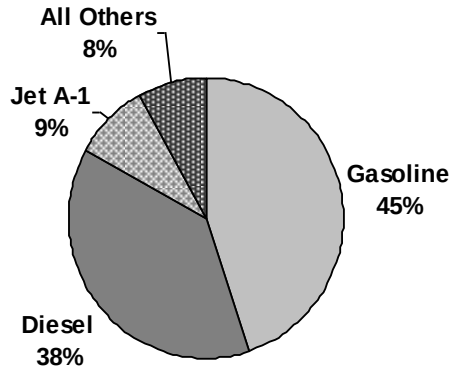
The South Africa and Botswana map indicates a second competing pipeline is being considered; which would run from Maputo to Gauteng. In the Consultant's view it is unlikely to be constructed; the distance is shorter than from Durban but the Port of Maputo, in Moçambique, is limited to relatively small vessels and further dredging (deepening) of Delgado Bay would be extremely costly.

Oil storage capacity at the various terminal and depots in the Gauteng area (and elsewhere in the RSA) is unknown. The government deems such information too sensitive to make it public. However, except for Durban, it is believed to be adequate. Third party access is strictly on a quid pro quo basis.

3. Market

At just over 25.5 million m^3, South Africa's market is certainly big enough to support price liberalisation. Figure A12.3 at right shows that over 90% of demand is from three products: gasoline at 45%, the highest percentage of all the E & SA study countries, diesel (gasoil) at 38% and Jet fuel at 9%. Illuminating kerosene, fuel oil and LPG demand are minimal.

Figure A12.3: Share of South African 2007 Oil Product Demand by Product Grade



Source: Annexe 6.1

Recent demand growth has been primarily from diesel / gasoil; an average of 8% pa since 2003 (refer to Table A12.5). For other products growth has been minimal. Moreover, the very high prices in the mid-2008 have caused overall growth to slow considerably; Third Quarter 2008 demand was 7% less than the Third Quarter of 2007[51]

[51] www.SAPIA.co.za /statistics /product demand.

4. Pricing & Taxation

South Africa has very detailed price controls which are continually being fine-tuned. A full description of the price system can be found on the DME website[52]. In brief it has seven components and works as described below, using 93 RON unleaded gasoline sold in Gauteng as an example. The retail price is the sum of the following seven elements:

1. **The in-bond landed cost**: including a "standard" tax-free landed cost items using international FOB spot reference prices (gasoline: 50% Med, 50% Singapore, illuminating and kerosene and diesel: 50% Med, 50% AG) plus freight and all related costs ***and deemed costal storage and stock financing costs***. The in-bond landed cost changes monthly based on the average costs from the previous month when converted into SA Rands.
2. **A zone differential**: representing the cost of transporting products from each of the five potential coastal ports to each of the approximately 45 separate Magisterial Districts in South Africa by the most economical mode of transport as determined by the DME on an annual basis. This zone differential is the only component of the prices which varies from one location (Magisterial District) to another – all other components are identical.
3. **Government take**: covering six elements (refer to Table A12.4) over 95% of which come from the fuel tax and road accident fund :
4. **Local (within the Magisterial District) depot and transport costs** (known in South Africa as the service differential: compensating OMCs for actual depot-related costs and delivery costs from the nearest depot to the retail outlets. The value is calculated on the actual historical cost from the previous year and averaged over the whole country and industry.
5. **An OMC (or wholesale) margin**: being the amount paid to the OMC through whose branded pump the product is sold to compensate for all associated OMC costs, including a return of 15% on the depreciated book value of assets, with allowance for additional depreciation but before payment of taxes and interest.
6. **Equalisation Fund levy** (known in South Africa as the Slate levy): used principally to adjust prices in the current month for any differences between actual and structure prices from previous periods due to time lags. It is also used to compensate synthetic fuel (from coal) producers in the event crude oil prices are below a certain level (believed to be US$ 18/Bbl). Apparently it was also used to finance the crude oil premium paid by South Africa during the 1970s. In December, 2008 this levy was 110 SA¢ /liter (10.8 US ¢ /liter) on PMS representing 15% of the retail price.[53]
7. **A retail margin**: which equals the average cost incurred by all service station operators, on the basis of the previous year.

[52] DME.gov.za/energy/liquid fuels. Annexure B, Oct. 2008. Also www.sasol.com /sasol /internet /downloads /fuel price.

[53] In January, 2009 the slate adjustment had dropped to zero.

Table A12.4, Retail price build-up in Gauteng gives an indication of OMC and retail margins based on South Africa's December, 2008 structure. For all three products the

Table A12.4: Retail Price Buildup in Gauteng
As of Dec. 3rd, 2008 in South Africa in SA cents and US cents per litre

		Notes		93 RON UNL			Illuminating kero.			Diesel 0.05% S(1)		
1	**In-bond landed cost**											
	Landed cost before storage and stock financ.		US$/m3	281			406			426		
	Exchange rate used in December, 2008 struct.		Rds/US$	10.18			10.18			10.18		
				SA ¢/L	**US ¢/L**	**%**	**SA ¢/L**	**US ¢/L**	**%**	**SA ¢/L**	**US ¢/L**	**%**
	In-bond landed cost in SA and US ¢ per liter			286	28.1	40%	413	40.6	66%	434	42.6	49%
	Deemed coastal storage	2		3	0.3		3	0.3		3	0.3	
	Deemed coastal stock financing cost	2		4	0.4		4	0.4		4	0.4	
	Basic fuel price expressed in Rands	3		293	28.8	41%	420	41.3	67%	441	43.3	50%
2	**Zone differential**											
	Transport cost from Durban to Gauteng			15	1.4		24	2.4		15	1.4	
	Ex-tax cost delivered to Gauteng terminals			**307**	**30.2**	**43%**	**444**	**43.6**	**71%**	**455**	**44.7**	**51%**
3	**Government take**											
	IP tracer levy						0			0		
	Fuel levy			127	12.5		0			111	10.9	
	Incremental inland transportation recovery levy			2	0.1		0			2	0.1	
	Petroleum products levy			0	0.0		0			0	0.0	
	Road accident fund levy			47	4.6		0			47	4.6	
	Customs and excise duty			4	0.4		0			4	0.4	
	sub-total duty, levies & funds			179	17.6		0	0.0		163	16.0	
	Tax paid cost to Magisterial District 9 (Gauteng)			**487**	**47.8**	**68%**	**444**	**43.7**	**71%**	**618**	**60.7**	**70%**
4	**Local depot & transport costs to end-users**	4		10	0.9	1%	17	1.7	3%	10	0.9	1%
5	**Wholesale (OMC) margin**			45	4.4	6%	45	4.4	7%	45	4.4	5%
	Wholesale selling price before slate adjustment			541	**53.1**	**75%**	506	**49.7**	**81%**	672	**66.1**	**76%**
6	**Temporary adjustment / stabilisation**	5		110	10.8	15%	114	11.2	18%	150	14.7	17%
	Wholesale price with slate adjustment			651	63.9	91%	621	61.0	99%	822	80.8	92%
7	**Retail (dealer) margin**	6		67	6.6	9%	7	0.7	1%	67	6.6	8%
8	**Retail Price**	6		**718**	**70.5**	**100%**	**628**	**61.7**	**100%**	**890**	**87.4**	**100%**
Combined OMC/dealer margin + coast storage		7		**119**	**11.7**	**17%**	**59**	**5.8**	**9%**	**119**	**11.7**	**13%**

Notes:

(1) The wholesale price of diesel is regulated but not retail price.

(2) Based on Botswana's structure for December, 2008 using the Pula / Rand exchange rate in that structure.

(3) All "typical" landed cost elements plus "deemed" coastal storage and finance costs which would be asociated with 25 days coastal stocks

(4) Known as the Service differential in South Africa and Botswana.

(5) The temporary "slate adjustment" is for past differences in actual and structure values; amounts shown are by difference.

(6) Hypothetical for diesel assuming diesel retail margin = motor gasoline. However, there is no retail diesel margin in the price structure.

(7) The coastal storage and stock financing components of IBLC accrue to the OMCs.

Source: Dec 2008 prices from DME Media Statement for Release Nov. 28th, 2008. Adjustment to the Fuel Price: Wednesday, 03 Dec. 2008.

OMC margin was US¢ 4.4 /liter, plus 0.7 US ¢/liter for deemed coastal storage and stock financing. The retail gasoline dealer margins was 6.6 US¢ /liter. Kerosene prices bear no dealer margin although there is a SA¢ 7.4 /liter "distribution" cost for agents. Retail diesel prices are not controlled; only wholesale prices.

End-user prices are estimated to be higher than they need be. The level of involvement by the State possibly contributes to this. Another likely factor is government policy regarding domestic refining and employment goals at the retail level[54]. While the OMC margin is low, it possibly could be lower given the size and context of South Africa's market. Even accepting the political objectives of keeping retail margins high for employment reasons it would seem the country would benefit from more competition at the:

- Supply level (i.e. liberalise product imports);
- Logistics level in terms of marine terminals;
- Marketing level in terms of more OMCs.

In terms of individual price structure components, no recommendations are put forward except that the structure may too complex and "fine-tuned". The government has invested many professional months of effort by independent consultants and industry in seeking the fairest possible system over a long period of time. While all the details are published on the internet, the structure is no longer transparent. Very few outside the OMCs and government who are directly involved, can follow all the minutiae and, therefore, determine if South Africa's downstream sector is indeed being as efficient as it could be.

5. Recommendations

The government should consider liberalising their downstream oil sector with an announcement that in three to five years time, product supply would be liberalised along with wholesale prices in all Magisterial Districts.

To ensure the proposed liberalisation policy was implemented the government (NERSA) should move to issue permits to build oil products storage terminals adjacent to Transnet Ports (or elsewhere that private sector OMCs wish to build them – provided they are on suitable, and suitably-zoned, sites).

OMC license criteria contained in Section 2B(1) of the Petroleum Product Amendment Act # 58 of April, 26th 2004 are robust and require no adaptation for such a possible liberalisation. They provide for the Controller of Petroleum Products to "give effect to the following objectives":

- Promoting an efficient retail petroleum industry;
- Facilitating an environment conducive to commercially justifiable investment;
- Promoting advancement of historically disadvantaged South Africans;
- The creation of employment opportunities and the development of small businesses in the petroleum sector; and

[54] The Consultant is not questioning the policies; simply pointing out they come at a probable commercial (but not necessarily an economic) cost.

- Ensuring countrywide availability of petroleum products at competitive prices.

NERSA should take over all economic regulatory functions related to the downstream oil sector which are currently carried out by the DME. NERSA would continue to issue licenses for pipelines and set tariff levels for these. South Africa is the only E & SA country studied judged to have the resources and capacity to be able to "afford" both a Ministry responsible for the downstream oil sector policy and some technical aspects and a regulator.

The DME's role should be confined to policy issues, some technical matters and the collection and publication of statistical information. (Most technical matters, such as HSE standards, weights and measures, etc. would be the responsibility of other ministries). At present the DME is, in effect overseeing the commercial fate of other government entities.

With regard to statistics, South Africa should shed its constraints on availability of information and publish data on oil storage and pipeline capacities.

With six grades of gasoline[55] and diesel suited to the geography, mix of vehicles, and environmental aspirations of, the country, no recommendations have been put forward as regards product qualities. The volume of lower-grade gasolines to be supplied allow refineries, especially the two inland ones, to produce a lower octane gasoline suitable for use on the high inland plateau of Southern Africa.

In addition no recommendations are proposed regarding jet fuel price efficiency even though it is possible into-plane at ORITA may not be open to third parties. This, despite the fact that the jet fuel tank farm and hydrant systems belong to the airport authority – another Transnet subsidiary. (The fuel oil business is marginal in South Africa and is not an issue.)

Table A12.5: South African demand by product and year in cubic meters

	Gasoline	Kero	Jet A-1	Gasoil	Fuel Oil	LPG	Total
2003	10,667	769	2,099	7,263	528	558	21,884
2004	10,985	798	2,076	7,678	569	563	22,669
2005	11,160	761	2,180	8,115	482	563	23,261
2006	11,279	738	2,269	8,708	476	605	24,075
2007	11,558	697	2,392	9,757	470	654	25,528
07 in %	45%	3%	9%	38%	2%	3%	100%
AACGR							
00 to '07	2%	-2%	3%	8%	-3%	4%	4%
Source :	www.SAPIA.za /statistics /product demand.						

[55] The Petroleum Product amendments Act nº 58 of 2003, gazetted in June, 2006 provides for three grades of metal free UNL petrol of 91, 93 and 95 RON respectively and three grades of "lead replacement petrol" (i.e. containing a metallic octane enhancer other than lead, typically phosphorus) with the same octanes.

Table A12.6: South Africa market shares by company in percent
Gasoline and Diesel Only: Year 2006

Rank	Company	Percent			HHI [1]
		Gasoline	Diesel	Weighted	
		(54%)	(46%)	Avg	
1	Engen	27	24	25	645
2	Shell	17	15	16	264
3	Chevron	16	15	16	247
	Sub-tot top three	60	55	57	1,156
4	Total	14	16	15	224
5	BP	15	14	15	214
6	Sasol	10	10	10	101
7	Tepco	0	3	1	2
8	Afric Oil	0	3	1	2
9	PetroSA	0.03	0.06	0.04	0
Total		**100**	**100**	**100**	**1,699**
Notes :					
1	HHI : Herfindahl-Hirschman Index; the sum of the squares of individual market shares. A common measure of market concentration.				
Source:	www.sapia.za / SAPIA 2006 Annual Report, Appendix # 10, p. 69.				

Annex 13 Botswana

Botswana is a member of the South African Customs Union (SACU) and its economy, including the downstream oil sector, is integrated with that of South Africa. While oil demand is much less than in South Africa, other institutional features are comparable including very similar oil price controls. Botswana is also entirely dependent on the South African oil supply and logistics infrastructure for its oil product needs, and has no separate pricing efficiency issues of consequence.

1. Legal, Regulatory and Institutional Framework – Sector Organization

1.1. Introduction

Oversight of Botswana's downstream oil sector, including management of Botswana's price structure is the responsibility of the Ministry of Minerals, Energy and Water Resources (MMEWR)**.**

1.2. Legal/Regulatory Framework

Botswana's institutional and regulatory features, set out in Table A13.1, are unlikely to contribute to price inefficiencies. Either the country coordinates with South Africa or it should have sufficient resources to manage on its own. However, the amount of information available to the public, or on the internet is very poor. Reportedly, Botswana is considering establishing an energy regulator. For a sector as small as Botswana's this is likely unnecessary but it might help with more data publication.

Table A13.1: Salient Regulatory Features of Botswana

End-user pricing basis		Controlled
	If controlled, price changes are :	Automatic, quarterly
	Primary governing legislation	Unknown
Economic regulator		Not yet; MMEWR
	Effectiveness / "resources"	Relatively High
	Primary governing legislation	n.a.
	Price management / monitoring	Co-ordinate with RSA
	Economic operator licensing criteria	Doubtful
	Fair trading	Unknown
	Contingency stocks	sub-contracts out
Technical oversight		MMEWR
	Effectiveness / "resources"	Relatively High
	Primary governing legislation	Unknown
	Infrastructure & operating standards	Co-ordinate with RSA
	Product qualities	Same as RSA
Subjective assessment of enforcement		No assessment
Source:	Consultant interviews and corresp. with Dept. of Energy Affairs, MMEWR late, 2008.	

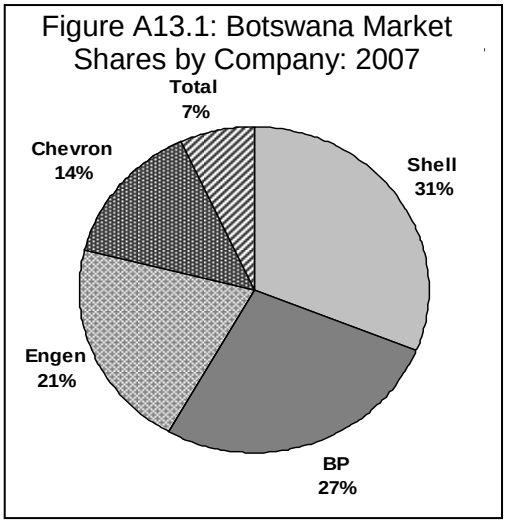
1.3. Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled

A positive feature, given that Botswana has no economy of scale factors which it can influence, is the total absence of government involvement in direct operations. Even the maintenance of contingency stocks is sub-contracted out to two OMCs.

Private Sector

Figure A13.1 displays the industry market shares. With only five marketers sharing total demand the potential for collusion exists; Botswana's HHI is a relatively high 2,367. Also, open access to depot capacity is limited. Partially offsetting this, barriers to market entry are low as there is a high level of synergy with affiliates in neighboring South Africa.



2. Supply, Procurement Arrangements and Infrastructure

Botswana's critical infrastructure, shown in Figure A13.2, includes:

- The South African delivery system to Gauteng;
- The Transnet pipeline terminal at Tarlton, the one closest to Botswana's rail system;
- The several OMC terminals in northern and western Gauteng which load road tankers for Botswana;
- Terminal and depots in Gaborone, and, likely, elsewhere along the transportation corridor north from Gaborone to Francistown.

Terminal numbers and capacity in Gaborone are not known; there may be two or three. It is understood, however, that third party use is strictly on a quid pro quo basis.

Two characteristics of Botswana's oil logistics do inhibit price efficiency: rail costs and, to a lesser extent, road tanker standards. Botswana's price structure is based on rail transport from Durban to Gaborone because of the constraints on the Transnet pipeline. (As previously noted, this should be eliminated in 2010.) Given the relative inefficiency[56] of South Africa's rail system (to what it could be with block trains, etc), Botswana is paying a price penalty until the Transnet pipeline constraint is eliminated in 2010.

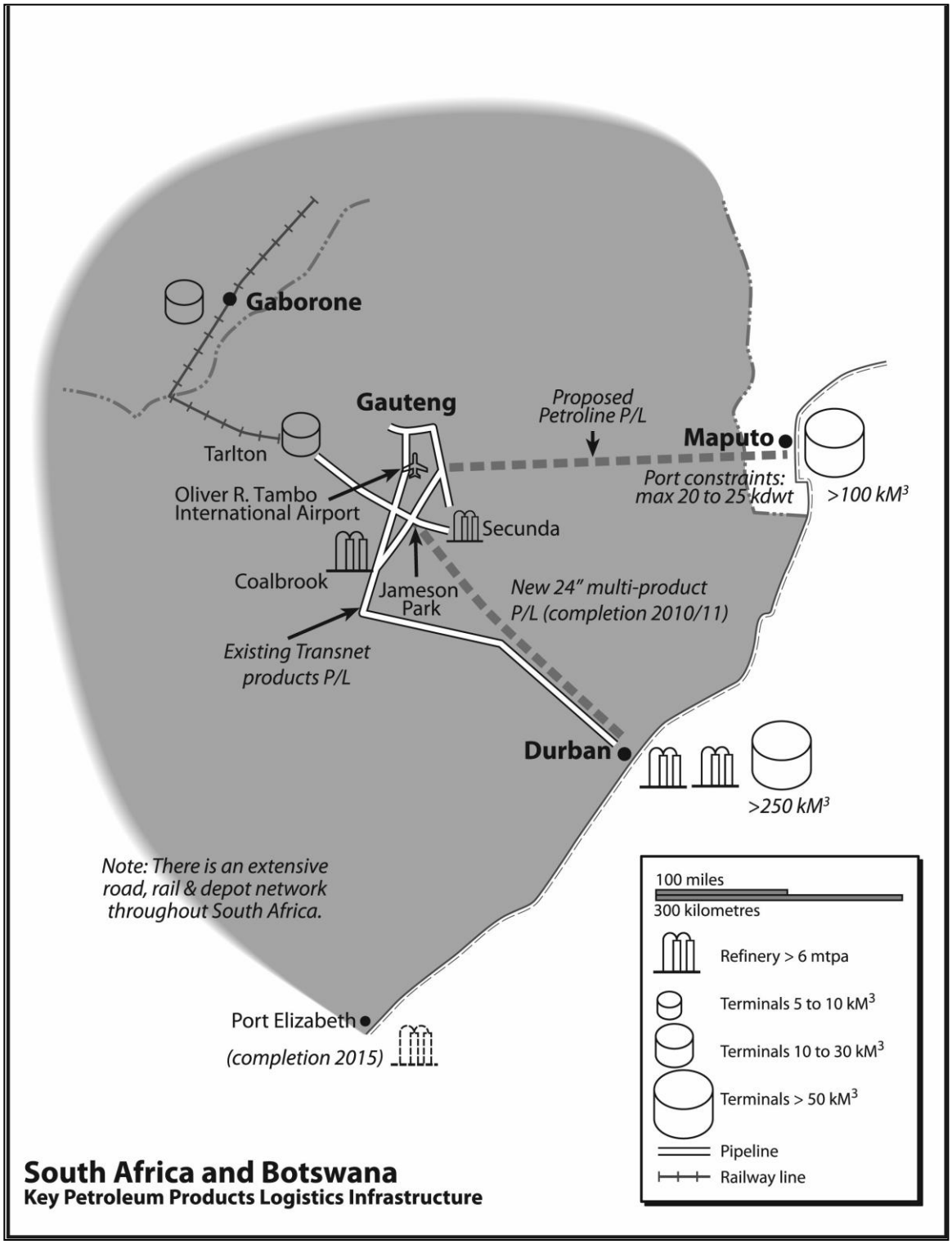
It is also likely that rail movements into Gaborone from Tarlton via Mafikeng are also less efficient than road tankers delivering into Botswana from other terminals in Gauteng, although actual rates proved impossible to obtain – even from Transnet Rail Freight.[57] This would particularly apply to towns further north from Gaborone, such as the mining center at Selebi-Phikwe. It can be served less expensively than by rail directly from Gauteng via Martin's Drift. Yet the price structure is based on the deemed rail freight.

[56] One official stated "the government walked away from the railways".

[57] Rail rates used in South Africa's price structure are those determined by the DME (based on old published rail rates times the CPI less 1%); they do not necessarily correspond to competitive rates offered by Transnet Rail Freight on specific routes.

Road tanker standards in Botswana have not, however, been fully adjusted to the changed load limit standards in force in South Africa (and in a number of other E & SA countries as discussed).

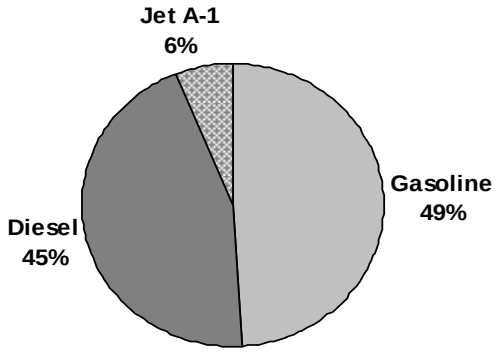
Figure A13.2: South Africa and Botswana Key Petroleum Product Logistics Infrastructure



3. Market

Botswana's 2007 oil product demand was estimated at 906 000 m[358]. Figure A13.3 shows that almost one half of Botswana's demand is for gasolines,[59] about 45% is for diesel and the remainder is for all other fuels, including jet fuel.[60]

Figure A13.3: Share of Botswana 2007 Oil Product Demand by Product Grade



Source: Annexe 7.1

4. Pricing & Taxation

Botswana applies essentially the same price structure as South Africa except that:

- It is calculated in Botswana Pula and Thebes instead of Rands and (SA) cents;
- Retail margins are lower (5.1 US ¢/liter vs 6.6 US ¢/liter);
- Rail freight (and not the pipeline tariff) is applied to the Durban Basic Fuel Price to obtain an ex-tax cost delivered into depots in Gaborone;
- It has different taxes, although the customs duties are the same;
- Prices change approximately mid-month with the date being at the choosing of the government. As in South Africa, OMC margins are adjusted for surpluses / deficits through the Equalisation Fund levy;
- Regional price variations are based on incremental road transport costs for every 50 km beyond Gaborone, instead of by Magisterial Districts as in South Africa.

Table A13.2 provides retail price build-ups for the three main retail products as of early December, 2008. All of the comments made in Annex XVI relating to South Africa's structure apply equally to Botswana's.

[58] Data sent to Consultant by e-m by the MMEWR, Oct. 2008.

[59] Although their statistics say "leaded" petrol it is actually lead replacement petrol of the same standards as South Africa. The "unleaded" petrol is "metal free".

[60] However, the data looks suspect and the MMEWR never responded to the Consultant's request for clarification. Jet fuel demand appears too low and no fuel oil or LPG data was included, although lubricant data was. Moreover, no data was available for prior years.

Table A13.2: Retail Price Buildup in Gaborone Effective Dec. 1st through Dec 11th, 2008 in Botswana Thebe and US cents per litre

		Notes		93 RON UNL			Illuminating kero.			Diesel 0.05%	
1	**Average FOB cost**		US$/m^3	246			371			389	
	Average marine freight incl demurrage		" "	32			32			32	
	Insurance @ 0.15 % FOB + freight		" "	0			1			1	
2	**CIF Cost**		" "	279			403			421	
	Marine losses @ 0.3% of CIF		" "	1			1			1	
	Port Charges by RSA's National Ports Auth.		" "	2			2			2	
3	**In-bond landed cost before storage & stock fin.**		US$/m^3	**281.8**			**407**			**425**	
	Rand : US$ exch rate		Rds/US$	10.16			10.16			10.16	
	IBLC expressed in SA cents		SA cents/L	286.3			413			432	
	Pula / Rand exchange		Pula/Rand	0.79			0.79			0.79	
				Thebe/L	**US ¢/L**	**%**	**Thebe/L**	**US ¢/L**	**%**	**Thebe/L**	**US ¢/L**
	IBLC expressed in Thebe (100 Thebe = 1 Pula)			225.0	28.2	38%	325	40.7	59%	339	42.5
	Durban storage			2	0.3		2	0.3		2	0.3
	Durban stock financing cost			2	0.3		3	0.4		3	0.4
	Basic fuel price effective Dec 1st, 2008			230	28.7	39%	330	41.3	60%	345	43.2
4	**Rail transport from Durban to Gaborone**			41	5.2	7%	41	5.2	7%	41	5.2
	Ex-tax cost delivered to Gaborone terminals			**271**	33.9	46%	**371**	46.5	68%	**386**	48.3
5	**Government take**	1									
	Customs Duty			3	0.4		0	0.0		3	0.4
	Fuel Levy			21	2.6		0	0.0		12	1.5
	Road fund			10	1.3		0	0.0		10	1.3
	Motor Vehicle Accident fund			10	1.2		0	0.0		10	1.2
	National Petrol Fund Levy (strategic storage)			9	1.1		0	0.0		9	1.1
	sub-total duty, levies & funds			53	6.6	9%	0	0.0	0%	44	5.5
	Tax paid cost to Gaborone			**323**	40.5	54%	**371**	46.5	68%	**430**	53.8
6	**Local depot and transport costs to end-users**										
	Local depot cost in Gaborone			5	0.6		5	0.6		5	0.6
	Transport cost to end-users within 50 km			9	1.1		9	1.1		9	1.1
	Grid differential	2		5	0.6		5	0.6		5	0.6
	sub-total			18	2.3	3%	18	2.3	3%	18	2.3
7	**Wholesale (OMC) margin**			36	4.5	6%	36	4.5	7%	36	4.5
	Wholesale selling price before adjustment			**377**	47.3	64%	**425**	53.3	77%	**484**	60.6
8	**Temporary adjustment / stabilisation**	3		176	22.1	30%	84	10.5	15%	156	19.5
	Wholesale price with adjustment			**554**	69.4		**509**	63.8		**640**	80.1
9	**Retail (dealer) margin**			40	5.1	7%	40	5.1	7%	40	5.1
10	**Retail price effective Dec. 1st, 2008**			**594**	74.4	100%	**550**	68.8	100%	**680**	85.1
	Combined OMC / dealer margin incl coast storage			**81**	10.1	14%	**82**	10.3	15%	**82**	10.3

Notes:

(1) Structures shown are for retail and comercial sales. Sales to the government bear lower tax rates.

(2) Assumed to be the weighted average cost of deliveries to the varioius 50 Km grids.

(3) Known as the "slate" adjustment in Botswana and South Africa, it is for past differences in actual and structure values.

5. Recommendations

Botswana has no choice but to stay closely in line with South Africa, and there is no indication it is not satisfied with the current arrangements for its downstream oil sector. However, should South Africa move towards liberalisation of the sector Botswana should obviously follow.

Otherwise there are only two recommendations. First, ensure that, as soon as the capacity constraint is removed on the Transnet pipeline, reduce the transportation component in the price structure. Second, align road tanker regulations with those of South Africa. While this will remove a physical inefficiency it will not reduce end-users prices (rather, it simply increases OMC profits) unless Botswana is able to establish lower transport rates beyond the pipeline which are based on road transport.

Table A13.3: Botswana annual sales figures in cubic meters: 2007 (1)

		%
93 RON lead replacement petrol	187,750	21%
91 RON unleaded petrol	250,660	28%
Kerosene	9,428	1%
Jet A-1	6,465	1%
Diesel 0.3 % +0.05 %	408,807	45%
Fuel oil, LPG and other(2)(3)	43,200	5%
Total	906,310	100%

Notes:

(1) No historical data is available for Botswana.

(2) Fuel oil, lubricants and others from IEA stats for 2005, increased by 5 % for 2007.

(3) By convention in SSA these products are in weight but added in the total as if they were in volume.

Market shares by company in percent: 2007

Rank	**Company**	**Percent**	**HHI (1)**
1	Shell	31	967
2	BP	27	718
3	Engen	21	428
4	Chevron	14	202
5	Total	7	52
Total		**100**	**2,367**

Note:

(1) Herfindahl-Hirschman Index, the sum of the squares of market shares. A common approach to determining market concentration.

Source: MMEWR, sent to Consultant by e-m, Oct. 2008.

Annex 14 Malawi

Malawi must work hard to achieve low end user prices. It is the smallest, in terms of oil consumption, and poorest of the E & SA study countries and its supply routes are less than ideal. Moreover the country is hindered by institutional issues. Nonetheless, Malawi has a good price structure and is taking steps to improve its governance.

1. Legal, Regulatory and Institutional Framework – Sector Organization

1.1. Introduction

Malawi's downstream oil sector is the responsibility of the Minister responsible for Energy. Reporting to him or her is the Malawi Energy Regulatory Agency (MERA).

1.2. Legal/Regulatory Framework

The institutional and regulatory structure of Malawi's downstream oil sector, set out in Table A14.1, has improved in the past several years. A private company constituted by the four operating OMCs, Petroleum Importers Ltd. (PIL), is now responsible for oil imports. A Malawi Energy Regulatory Agency (MERA), reporting to the Minister responsible for Energy, was established which, inter alia, manages the price control structure. Finally, new regulations to implement the 2004 Energy Act, were developed in conjunction with the OMCs.

Table A14.1: Key Regulatory Features of Malawi

End-user pricing basis	Controlled
If controlled, price changes are :	Ad hoc
Primary governing legislation	Energy Act 2004
Economic regulator	MERA
Effectiveness / "resources"	"in formation" since 2007
Primary governing legislation	Energy Act 2004
Price management / monitoring	MERA
Economic operator licensing criteria	Yes
Fair trading	In theory
Contingency stocks	Goal = 90 days (1)
Technical oversight	Unknown
Effectiveness / "resources"	Unknown
Primary governing legislation	Energy Act 2004
Infrastructure & operating standards	Good
Product qualities	Good
Subjective assessment of enforcement	Too soon to know
Notes :	
(1) However, Malawi only has storage capacity to handle max of 15 days; www article dated Feb. 2007, ISI Emerging Markets, Africawire.	
Source: Independent oil consultant; www, telephone & e-m Interviews with industry, late 2008.	

Despite the developments noted above it will require significant effort to eliminate institutional factors hampering price efficiency in Malawi. And, it is too soon to measure the results of the regulatory changes. It is the smallest of the seven E & SA study countries.

- The second smallest population;
- The lowest GDP per capita;
- The lowest oil consumption.

Moreover, Transparency International's 2007 rating, at 2.7, was the second lowest of all E & SA study countries.[61]. On the positive side the government has minimal operating involvement in the sector.

[61] TI www. 2007 Ratings. The other 7 countries ratings were : Botswana : 5.4, South Africa : 5.1, Tanzania : 3.2, Uganda : 2.8, Malawi : 2.7, Kenya : 2.1. A rating of < 5.0 indicates there are problems.

1.3. Institutions Specific to the Hydrocarbons Sector

State Owned or Controlled

Apart from owning and operating some minor logistics infrastructure, the Malawian government no longer is involved in downstream oil operations.

Private Sector

Four OMCs compete for the Malawian market: three multinationals (BP, Chevron, and Total) and Petroda. Only limited market share information is available but with 4 companies the minimum HHI would be 2,400 and, assuming the three multinationals have 90% of the market and Petroda only 10%, the HHI would be 2,800. Either number indicates that price efficiency could not be achieved without controls. Indeed, Malawi has long had a price structure which is appropriate given that the market is too small to support the numbers required for competition.

Malawi's OMCs can achieve only limited synergies with affiliates in Tanzania and Mozambique.

2. Supply, Procurement Arrangements and Infrastructure

Meeting Malawi consumers oil product needs involves a complicated logistical system. Figure A14.1 shows that the country is mainly supplied by road from the Mozambiquan port of Beira with secondary routes being from Dar es Salaam and Nacala. The last source is a straight forward all-rail route. However the corridor from Dar involves three modes of transport:

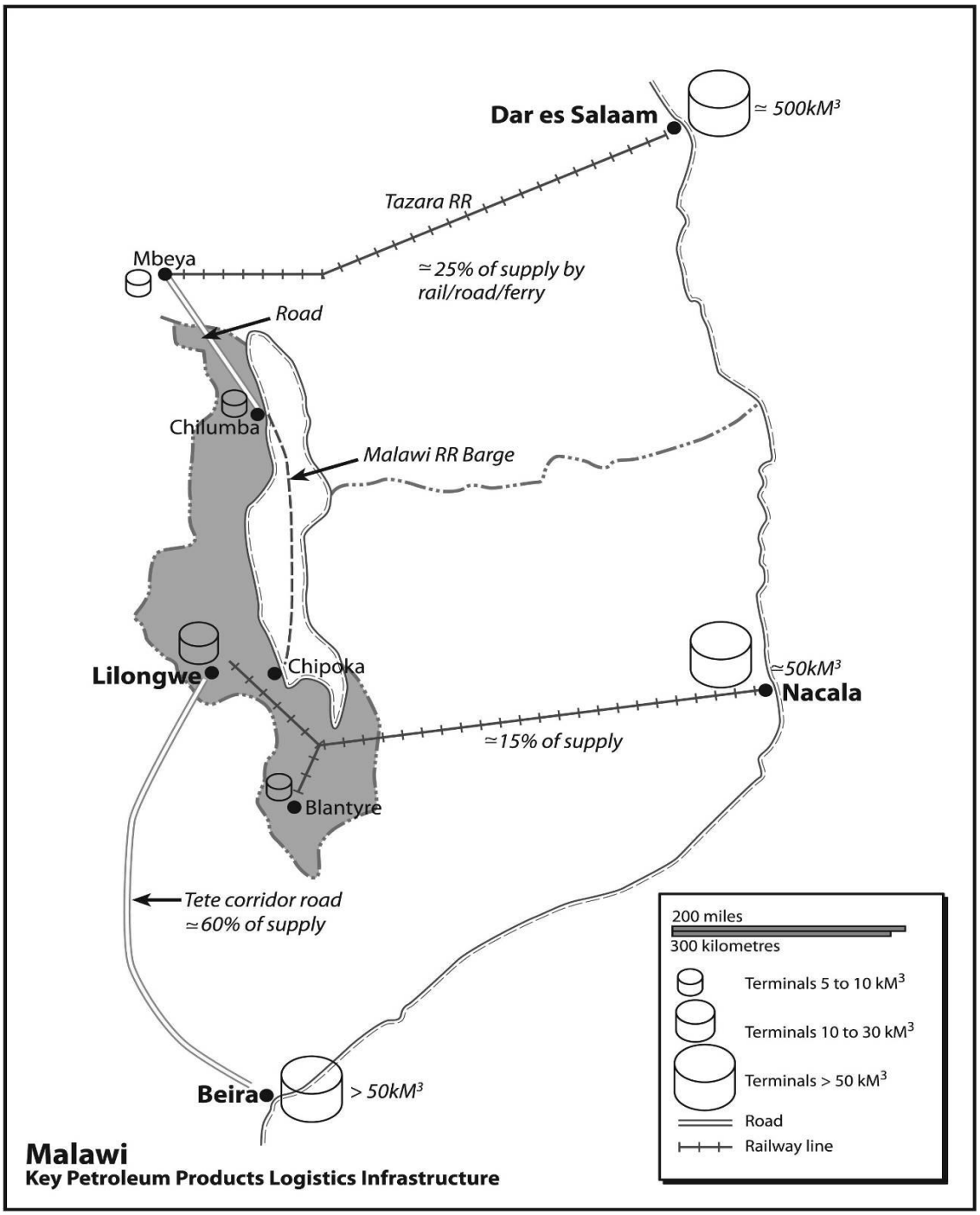
- From Dar es Salaam to Mbeya by the TAZARA RR;
- From Mbeya to Chilumba on Lake Malawi by road;
- Then by Malawi RR barge (in small tanks) down to Chipoka near Lilongwe.

Table A14.1 summarises some of the logistics features shown in the Figure A14.2 map. The three supply ports are Beira, Dar es Salaam and Nacala. The first two have adequate water draft and onshore terminal capacity to readily handle Malawi's needs. But, both are primarily intended to serve other markets at the same time. Nacala has good water depth at the port but storage facilities for petroleum products are limited. Commercial access is good in Tanzania but only fair in the other two ports. Third party access would be on a quid pro quo basis.

Product is imported on a joint tender basis (done annually) by the Petroleum Importers Ltd., (PIL) a private company comprising the four operating OMCs.

Depending on the offers received PIL imports through each of the three supplying ports to optimize delivered supply costs. PIL was created several years ago and took over from the Petroleum Control Commission (PCC).

Figure A14.1: Malawi Key Performance Products Logistics Infrastructure



Some pricing efficiencies could be achieved if Malawi's transport infrastructure were better. About 60% of product moves into Malawi by road via the Tete corridor.[62] The road is thought to be in good condition. Otherwise product is delivered into the country by rail and or rail and road.

[62] Based on the weighted average supply costs in the Price Structure presented in Section 5.

The TAZARA RR, used from Dar es Salaam to Mbeya is in fair condition while the rail line through Mozambique from Nacala is in poor condition despite efforts to upgrade this corridor.

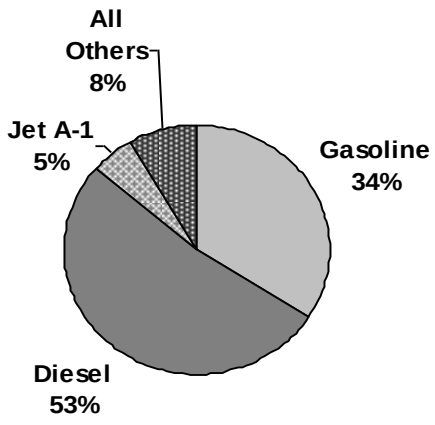
Storage in Malawi is extremely limited; less than 20 000 m^3 in the whole country.[63] Less than 2 000 m^3 of this belong to the government at three sites to facilitate the barge movements on Lake Malawi.

Depot storage at consuming centers is inefficient from the perspective of oil pricing. While total country storage by the private sector is very limited at about 17 000 m^3 it is scattered in 13 depots in four centers.[64] For example Lilongwe has 5 depots with an average of less than 1 000 m^3 each. It would be better to have fewer depots with greater throughputs and better environmental and operational controls at each but this would require more cooperation between companies which is on a quid pro quo basis

3. Market

Figure A14.2 shows that, like all other seven E & SA study countries demand is largely for two products: motor gasoline and diesel fuel/gasoil. Other products accounted for less than 15% of the total. Note, however, that 13 500 m^3, or just over 10% of all gasoline sold in 2007 was ethanol which is sold as a separate product at retail outlets. It is potentially subject to price controls.[65]

Figure A14.2: Share of 2007 Oil Product Demand in Malawi by Product Grade



4. Pricing & Taxation

Malawi has long had price controls which are appropriate to its overall economic and political context as discussed above. Described in Table A14.2, they are well designed and appear to contribute to overall pricing efficiency with one possible exception.

Prices are meant to change monthly if the delivered cost to Malawi, expressed in Malawi Kwacha, changes by more than 5%. However, MERA only manages the structure[66] and proposes changes to the government. Depending on the arrangements for over and under-recovery this may cause potential price inefficiencies.

One unique feature of Malawi's structure is that it includes Jet fuel, as well as LPG.

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[63] Consultant G. Dikker-Hupkes, October, 2008.

[64] Ibid.

[65] Article 54 of Malawi's 2004 Energy Act states : " The Authority shall, at the instance of any licensee dealing with bio-fuels or gas, approve maximum prices of bio-fuels and gas on the recommendation of the Liquid Fuels and Gas Pricing Advisory Committee."

[66] Recommended prices are determined by the Liquid Fuels and Gas Pricing Advisory Committee comprised of the OMCs (including likely, a MERA member).

The structure starts with the actual weighted average cost from the previous month for each product delivered into road tank wagons or rail cars at each of the three ports. These are based on the annual supply contracts negotiated by PIL. Actual transport costs into Malawi are also determined as weighted averages of each of the three supply routes. The result, after converting to Malawi Kwa/liter, is the in-bond landed cost delivered into depots in Lilongwe and Blantyre.[67]

Levies, funds and taxes are added to the above to arrive at a tax-paid cost before OMC margins, which include depot costs within Malawi and local transport costs to retail outlets, and retail margins. Their addition yields the retail price proposed by MERA to the government which makes the final decision whether to implement the proposals or not. The resulting OMC margins, are approximately 17 US¢/liter to 19 US¢/liter, and include local depot costs, retail margins and transport to end-users. They are:

- of the same order of magnitude as those of Kenya, Madagascar and Tanzania;
- high compared with Botswana and South Africa;
- well below those of Uganda.

One potential inefficient feature of the above structure is the reluctance of government to apply the results. Since the structure was introduced in 2005 only two price increases have been identified[68] : one in January, 2008 for 5% and one in June 2008 for 25%.

[67] It is assumed that this represents a weighted average cost delivered into depots at other consuming centers such as Blantyre.

[68] Article nº 43 of Malawi's 2004 Energy Act requires MERA to publish in the Government Gazette monthly reviews and revisions. However, the Consultant has been unable to find any such public notices.

Table A14.2: Indicative Retail Price Buildup in Lilongwe
December, 2008 in Malawi Kwacha and US cents per litre

		Notes		93 RON UNL			Illuminating kero			Gasoil /
1	**Indicative in-bond landed cost into coastal ports**	1	US$/m^3	325			457			412
	Indicative in-port costs	2	" "	10			10			10
2	**Wt average FOB price (ex all three coastal ports)**		" "	**335**			**467**			**422**
3	**Inland transport to Lilongwe**									
	Rail freight (wt avg)	3	" "	12			0			12
	Roal haulage (wt avg)	3	" "	114			128			111
	Insurance and handling (wt avg)	3	" "	8			6			8
	Losses in transit from coast @ 1.0% FOB coast	2	" "	3			5			7
	Sub-total			138			150			137
4	**In-bond landed cost delivered into Lilongwe depots**		US$/m^3	**473**			**617**			**559**
	Exchange rate	4	MKwa/US$	142			142			142
				M Kwa/L	**US ¢/L**	**%**	**M Kwa/L**	**US ¢/L**	**%**	**M Kwa/L**
	Delivered ex-tax cost in M Kwa and US ¢/L			67	47.3	47%	88	61.7	69%	79
5	**Malawi duties, levies, funds etc.**	3								
	Energy Regulator Levy			0.4			0.2			0.4
	Road Levy			14			0.0			11.7
	MBS Cess @ 0.2 % of IBLC			0.1			0.2			0.2
	Energy Fund			1			0.4			0.4
	Price Stabilisation Fund @ 5 % of IBLC			3			3.4			4.0
	sub-total funds and levies			18	12.7	13%	4	2.9	3%	17
	S.t. price subject to duty			85			92			96
	Duty @ 10 % of IBLC except kero @ 5 %			7	4.7		4	3.1		8
	Excise duty @ 29%, 15% (kero) & 30% (AGO)			27	18.8		14	9.7		26
	Sub-total duties, levies, funds etc.			51	36.3	36%	22	15.7	18%	51
	Tax paid cost into Lilongwe depots			119	83.5	82%	110	77.4	87%	130
6	**Local transport to retail outlets**			2	1.4	1%	1	0.8	1%	1
7	**OMC and dealer margin**	3								
	Retail margin			10	6.7	7%	6	4.4	5%	9
	OMC margin			14	9.9	10%	9	6.3	7%	10
	Sub-total			24	16.6		15	10.8		18.9
8	**Indicative retail prices**			**144**	**101.5**	**100%**	**126**	**89.0**	**100%**	**150**

Notes:

(1) Based on October, 2008 proposed structure IBLC less decrease in Dar es Salaam CIF prices between Oct. and Dec. 2008.

(2) Consultant's estimate based on previous assignments in Dar es Salaam, Beira and Nacala.

(3) For comparative purposes all levies and funds are considered as "taxes".

(4) Based on October exchange rate of 142 M Kwa / US$; the July 2008 US $ buying rate was 141.2 M Kwa; the March, 2009 buying rate was 144.3

Source : Malawi 8th Sept. 2008 Price build-up adjusted for November FOB prices and exchange rates for application in Dec. 2008 . Industry sources ir

5. Recommendations

The key to achieving price efficiency in Malawi rests with MERA and with the government in accepting MERA's recommendations as regards pricing and all other matters within its mandate. It is also recommended that Malawi be offered some form of technical assistance to help its regulator become effective. MERA should also review the costs in the OMC margins with a view to encouraging depot rationalisation.

As a related issue, MERA maintains unnecessary confidentiality of its data.; no information is available on MERA's website. It should be more transparent in its activities and make available to the public information on the activities of the sector under its responsibility.

Annex 15 Madagascar

Madagascar moved from a fully state-controlled (via SOLIMA) downstream oil sector to a liberalised one, but with one private monopoly logistics company, about 5 years ago. It started with recommendations for liberalisation in 1998 and culminated with its implementation and a functioning downstream oil regulator over the past few years. In theory the institutional structure of the sector put in place is well adapted to Madagascar's unique circumstances. There are, however, regulatory oversight issues which hamper price efficiency.

1. Legal, Regulatory and Institutional Framework

1.1. Introduction

Oversight of Madagascar's downstream oil sector, including management of its price structure and technical aspects is the responsibility of l'Office Malgache des Hydrocarbures (OMH) which in turn is under the Ministry responsible for Energy (Ministère de l'Energie est des Mines).

1.2. Legal/Regulatory Framework

The institutional and regulatory structure of Madagascar downstream oil sector, is set out in Table A15.1.

Table A15.1: Salient Regulatory Features of Madagascar

End-user pricing basis	Liberalised
If controlled, price changes are :	n.a.
Primary governing legislation	Loi 2004-003, June '04
Economic regulator	OMH
Effectiveness / "resources"	Mixed
Primary governing legislation	Décret 2004-700, June '04
Price management / monitoring	Limited
Economic operator licensing criteria	None
Fair trading	Unknown
Contingency stocks	Unknown
Technical oversight	OMH
Effectiveness / "resources"	Limited
Primary governing legislation	Décret 2004-700, June '04
Infrastructure & operating standards	Arrêté 21056/2007/MEM
Product qualities	Arrêtés 22440-541/2004/MEM
Subjective assessment of enforcement	Weak

Source: Consultant interviews with OMH and industry, mid-November, 2008

Refined product specifications may impact price efficiency in Madagascar. Except for 87 RON leaded gasoline, its products' key quality parameters[69] are readily obtainable from international markets.

- Unleaded gasoline (approx 20% of gasoline in 2007): 91 RON unleaded;
- Regular gasoline (Essence tourisme, approx 80% of gasoline in 2007): 87 RON, 0.3 grams/liter of lead;
- Illuminating kerosene: 0.2%S with a 19 (ASTM D 1322) min smoke point;
- Automotive gasoil: 0.5%S with a cetane index of 48.

With the permanent closure of the out-dated Galena refinery Madagascar may have difficulty obtaining low octane leaded gasoline. If the OMCs are not "using-up" small remaining stocks of the lead compound they may be paying an unnecessarily high price for this product.

Madagascar's downstream oil sector was completely liberalized by Loi Nº 2004-003, June '04. With this legislation, Madagascar went from a country with total government involvement in the sector, via its former NOC, SOLIMA, to having no involvement whatsoever:

[69] Provided to Consultant by OMH during the field visit. OMH arrêtés numbered 22440 to 24541/2004/MEM and arrêté number 155/2006/MEM/OMH.

- Price controls were removed;
- Imports were liberalized;
- A single monopoly logistics company (LPSA) was formed;
- SOLIMA's retail network was broken into three or four groups and sold;
- OMH was created to regulate the sector.

In theory a good approach to liberalisation, because of Madagascar's small market size, its dispersed nature and the need for small coastal movements, it seems the operators are under no pressure to minimize costs:

- Oil imports are made on a joint cargo basis but this is voluntary;
- There is no control over the Galena Refinery Terminal to reduce its costs and fees:
  - No other company has been able to get a permit to construct a terminal at Tamatave Port.
- Likewise, LPSA is under no pressure to be efficient.

Indeed a reading of the statutes creating OMH (Décret Nº 2004-670, Statut et attributions de l'OMH) indicates OMH has no regulatory powers over the operators.

OMH, is therefore crucial to the success of Madagascar's liberalization. While they do a good, but sporadic, job at making statistics available they lack enforcement powers. And they are far from the openness of Tanzania when it comes to publishing estimated price build-ups.

It is not known how effective the OMH is with regards to technical oversight. However, the OMH has generally relied on consultants to draft their texts which are, absent these few key oversights, good.

1.3. Institutions Specific to the Hydrocarbons Sector

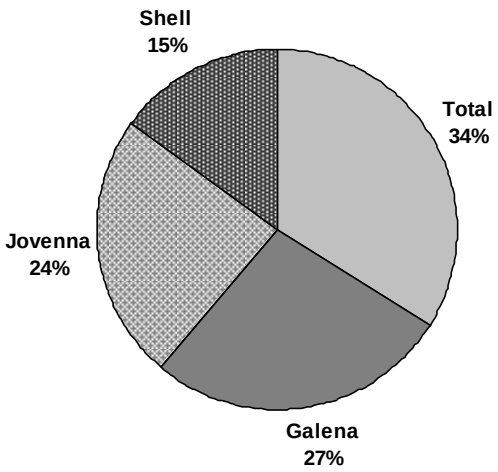
State Owned or Controlled

As indicated above, with its 2004 liberalization Madagascar went from a country with total government involvement in the sector, via former state companies NOC and SOLIMA, to having no involvement whatsoever.

Private Sector

Four companies share the market resulting in a potential cartel situation with an HHI of 2,675 as shown in Figure A15.1. While there is no evidence of anti-competitive behaviour it points to the need to have a strong regulator.

Figure A15.1: Madagascar Market Shares by Company: 2007



2. Supply, Procurement Arrangements and Infrastructure

Figure A15.2 together with Table A15.2, summarise Madagascar's logistics circumstances. The single issue causing pricing inefficiency at the logistics level is potential inefficiencies at the monopoly distribution company, especially disproportionate use of road transport instead of rail.

The country depends entirely on refined product imports, mainly from the Middle East, but also from East Africa and Durban in South Africa.[70] All of the companies voluntarily import on a joint cargo basis to keep marine transport costs down. (Each takes responsibility for its own share but the cargo comes from a common source.)

About 75% of Madagascar's consumption moves through the single terminal in the country's primary port at Tamatave which can readily handle cargoes of 50 k dwt. From there it is shipped, mainly by road, to the interior plateau or around the coast in small tankers. There are also some direct imports in Mahajanga, Nosy Bé and Antsiranana but, in small tankers.

The issue of road versus rail movements from Tamatave to the interior plateau, especially Antananarivo, is a major symptom of pricing inefficiency in Madagascar. The (market-based) rate for road movements as established by OMH is 73.5 MAriary/liter compared with 46.7 MAriay/liter by rail. Yet in 2008 less than 30% was shipped by rail and over 70% by road.[71] While it may only be recently that MADARAIL has been in a position to offer efficient rail service to Antananrivo, they now are, and it is important that these potential savings (MADARAIL estimated about 900 million MAriary, or about US$ 500 k at 1,735 Mar/US$ for 2008) be realized. This is based on the following assumptions:

- 40% of the volume moved by rail instead of 28%;
- 273 million liters were shipped from Tamatave to Antananarivo in 2008;
- A rail tariff of 46.7 M Ariay per liter;
- A road tariff of 73.5 M Ariay per liter;
- An exchange rate of 1,800 M Ariay per US$

In addition rail movements result in: less road degradation, fewer road accidents and less chances for fraud.

The obstacle to increasing rail movements appears to be Société Logistique pétrolière SA, (LPSA) which owns and controls all terminals and depots, and has a monopoly on bridging movements between them. The one exception is the one (and only) terminal at Tamatave which belongs to the Galena Refinery (GRT), an affiliate of one of the four OMCs. Again this is a monopoly; LPSA has no choice but to use the GRT.

[70] The country's sole refinery has been permanently closed for over five years with parts of the tank farm now being used as a storage terminal. Owned by the Galena Refinery it is the only terminal in Tamatave.

[71] Provided to the Consultant by MADARAIL, Nov. 25th, 2008.

Figure A15.2: Madagascar Key Petroleum Product Logistics Infrastructure

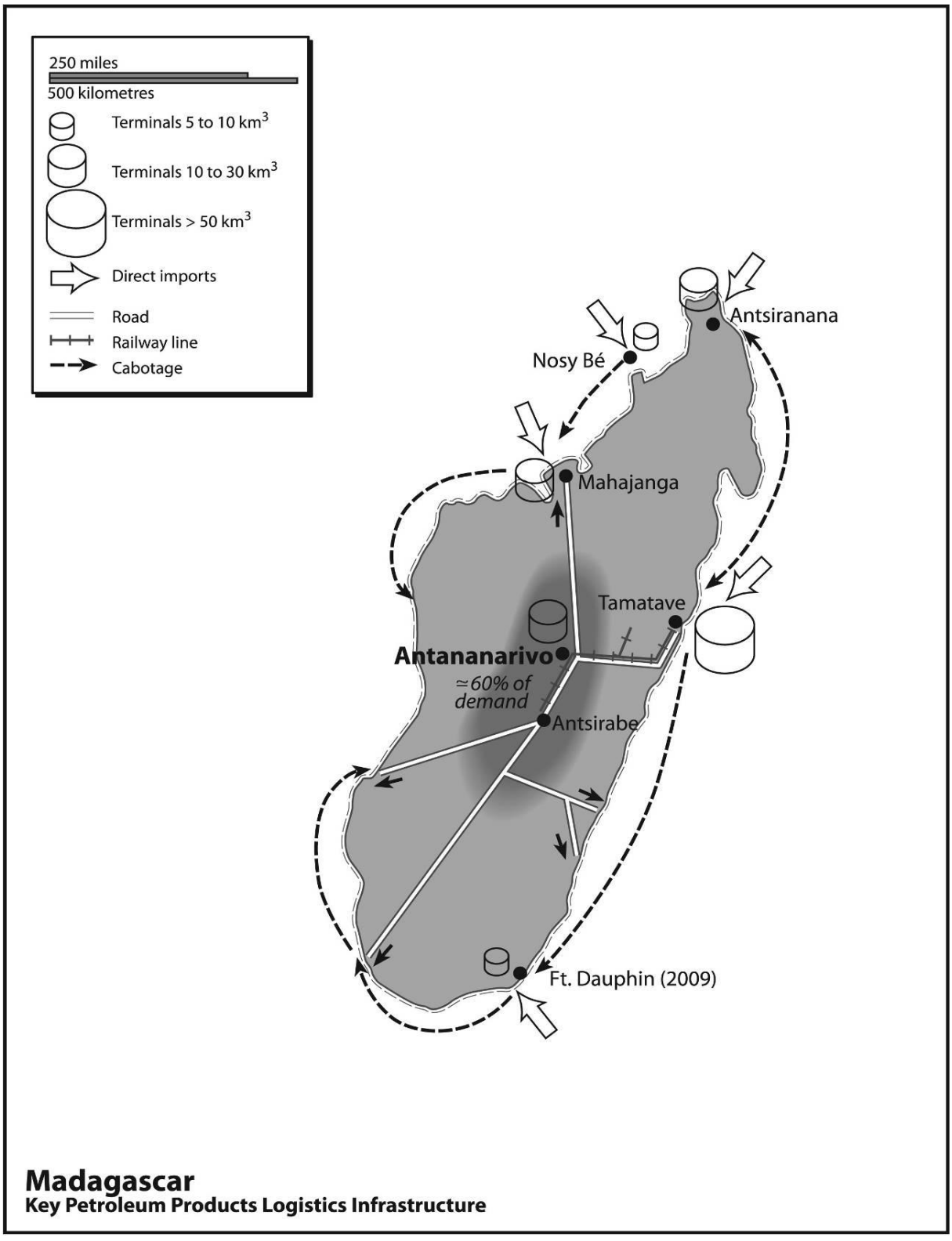


Table A15.2: Summary of Madagascar's Oil Logistics Infrastructure		
Primary supply sources (typical)		Middle East
Joint purchases		Yes, voluntary
Primary port for product imports		Tamatave
Indicative max. cargo size	10^3 dwt	> 50
Secondary port for product imports		None > 20
Indicative max. cargo size	10^3 dwt	< 20
Oil storage terminals at primary port	Number	1
Approximate capacity	$10^3 m^3$	~ 100
In terms of days consumption (total 2007)	# of days	50 to 60
Third party access		Yes, but a monopoly
Primary transport mode to main consuming centres		~ 70 % by road
Current transport capacity		Good
Third party access		No
Main consuming centre		Antananarivo
Oil storage terminals at main centre	Number	1 or 2
Approximate capacity	$10^3 m^3$	Thought to be ~ 20
Third party access		Yes
Note: The logistics company, Société Logistique pétrolière S.A. (LPSA) declined to meet with the Consultant. LPSA has a monopoly on arranging all bridging transport beyond Tamatave and other import terminals.		
Sources :		
Consultant interviews in Antananarivo, Nov. 2008.		

3. Market

Madagascar's modest market of about 670 000 m^3, dispersed over a wide area, was a significant factor in the design of Madagascar's liberalisation. Table A15.4 shows that, at 60%, gasoil dominates refined product consumption in Madagascar; the second most consumed product is gasoline at 16%. The Figure also shows that demand growth has averaged 3% p.a. since 2003.

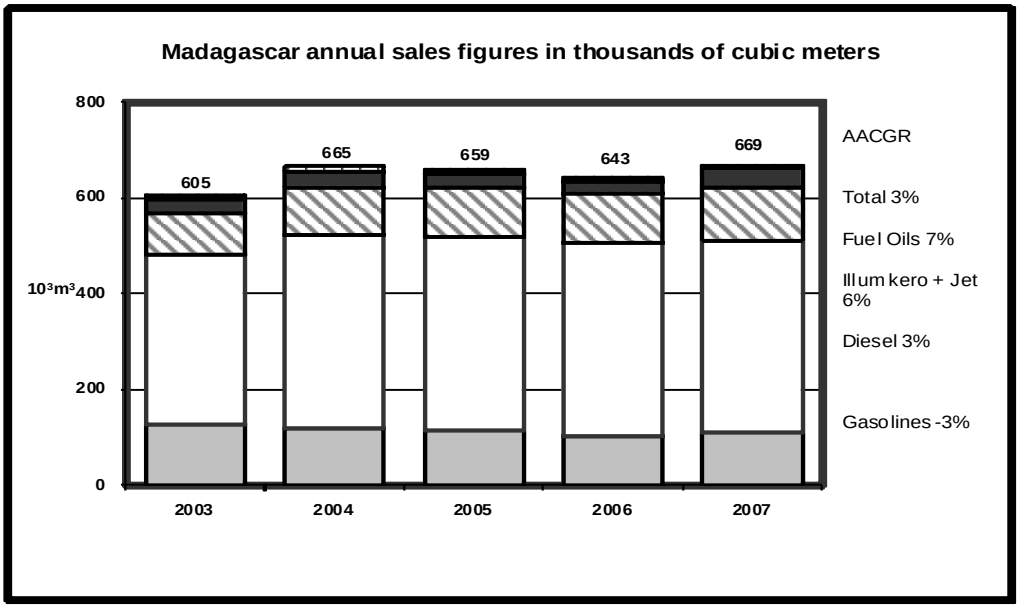
4. Pricing & Taxation

Table A15.3, on the following page, gives an approximate build-up of prices for the three main retail products in Antananarivo as of December, 2008.

The appropriateness of the cost elements can be summarized as follows:

- In-bond landed costs are very likely as low as realistically possible, given that joint cargos are purchased by the four OMCs;
- The Galena terminal fee of US$ 18.50/m^3 appears too high relative to terminal costs in Tanzania (US$ 7.50/m^3) and Kenya (US$ 3/m^3) and likely represents monopoly rent;
- The LPSA storage and handling fee, $120 to $130/ m^3 including all bridging costs, marine, road, and rail, is also excessive based on benchmarking norms.(that cost is equivalent to the average SSA long-distance trucking cost for 1200 to 1300 km distance, well in excess of the average distances in the Madagacaar system);
- Retail and OMC margins appear reasonable.

Figure A15.3: Madagascar annual sales figures, 10^3 m^3



As in other E & SA countries studied, fuel oil is purchased on, generally annual, contracts which are based on an international reference price in US$/Tn plus a premium which includes delivery to the point of consumption. The premium is constant for the duration of the contract; the reference price is based on the price at the date of delivery.

Product prices are uniform throughout Madagascar. Although this is an informal understanding not written into the regulations, it works largely because of the monopoly logistics company maintaining an equalized, "postage stamp", ex-depot price throughout the country.

6. Recommendations

It is recommended that the decree establishing OMH be amended to give it regulatory oversight over GRT's and LPSA's tariffs.

OMH should also publish its estimated build-up of retail prices, including detailed information used to estimate in-bond landed costs much like Tanzania does.

In addition the potential future demand for fuel oil is significant. JIRAMA, the electric utility is building significant new fuel oil-based generating capacity. And several major mining projects will be constructed to use fuel oil. As with other E & SA countries within this study, these customers are evaluating fuel quality supply options, including the trade-offs between (380 cSt fuel oil and 180 cSt fuel oil): FOB source costs and delivery costs, first by small tankers to Madagascar, and then by rail or road to the points of consumption. In this regard the likely sources of the 380 cSt and the availability of small heated tankers to transport it to Tamatave (or Ft. Dauphin starting late 2009) is vital to determining the CIF Madagascar price. For JIRAMA, rail delivery from Tamatave will not be a problem. MADARAIL expects delivery of heated rail cars in early 2009.

Table A15.3: Approximate Retail Price Buidup in Madagascar (1)
As of December, 2008 in Madagascar Ariary and US cents per litre

		Notes		91 RON UNL			Illuminating kero			Gasoil / diesel 0.	
1	**In bond cost, landed Tamatave**										
	Previous month in US$/Tn	2	US$/Tn	1,001			931			766	
	Conversion to cubic meters	3	m^3/Tn	1.374			1.264			1.18	
	in US$/$m^3$		US$/$m^3$	729			737			649	
	Late October US$ exchange rate	3	Ary/US$	1,800			1,800			1,800	
				Ary/L	**US ¢/L**	**%**	**Ary/L**	**US ¢/L**	**%**	**Ary/L**	**US ¢/L**
	In bond cost, landed Tamatave in Ary/L	**2**		**1,311**	**73**	**46%**	**1,326**	**74**	**72%**	**1,169**	**65**
2	**Storage and logistics costs**										
	Galena Rfy Terminal fee @ 18.50 US$/$m^3$	4		33	2	1%	33.3	2	2%	33	2
	Cost ex Galena terminal, Tamatave			1,345	75	47%	1,359	76	73%	1,202	67
	Logistics cost (LPSA)	3		229	13	8%	218	12	12%	218	12
	Ex-tax cost to OMCs ex LPSA terminal			**1,574**	**87**	**55%**	**1,577**	**88**	**85%**	**1,420**	**79**
3	**Government take**	5		**1,165**	**65**	**41%**	**19**	**1**	**1%**	**699**	**39**
4	**Indicative local transport to retail outlets**	6		36	2	1%	36	2	2%	36	2
5	**Calculated OMC and dealer margin**										
	Indicative retail margin	6		36	2	1%	36	2	2%	36	2
	Calculated net OMC margin	7		49	3	2%	182	10	10%	339	19
	Sub-total			85	5	3%	218	12	12%	375	21
6	**Madagascar retail prices early Dec 2008**	3		**2,860**	159	**100%**	**1,850**	103	**100%**	**2,530**	141

Notes and sources.

(1) Prices are, by tacit agreement, uniform throughout Madagascar.

(2) Values are back-calculated based on source indicated in footnote # 3.

(3) www.omh.mg / prix / publication des prix par omh / communication-prix-nov-08. Prices effective Nov. 22nd and applicable in early Dec. 2008.

(3) Estimated by the Consultant at US ¢ 2.0/L or 36 Ary/L @ 1,800 Ary/US$ in mid-November, 2008.

(4) From Industry source during consultant's visit late November, 2008.

(5) November, 2008 averages; refer to source indicated in footnote # 3.

(6) Estimated by the Consultant.

(7) Based on calculated margin from OMH's estimated distribution cost (see footnote # 3) plus exchange rate adjustment of : nil for 91 RON, 60 Ary/L for illuminating kero and 52 Ary/L for gasoil.

Table A15.4: Consumption of petroleum products in Madagascar: 2003 to 2007 in cubic meters								
								AACGR
		2003	2004	2005	2006	2007	%	%
Super gasoline		5,699	6,928	7,339	12,671	19,647	3%	36%
Regular gasoline (Tourist gasoline) [(1)]		119,615	112,781	105,285	90,612	89,901	13%	-7%
	87 RON, 0,3 gms Pb/L							
Illuminating kerosene		43,923	46,374	41,174	39,809	42,010	6%	-1%
Jet A-1		42,059	55,274	63,673	65,572	66,151	10%	12%
Gasoil		356,243	401,938	403,739	400,900	402,152	60%	3%
Fuel oil (380 cSt, 3.5 % S)		30,700	33,081	29,209	25,590	40,667	6%	7%
LPG [(2)]		6,341	7,924	8,008	6,822	7,315	1%	4%
Aviation gasoline		720	921	795	553	759	0%	1%
Total		**605,300**	**665,221**	**659,222**	**642,529**	**668,602**	100%	3%
Source : Statistiques pétrolières nationales (2003 à 2007), OMH, Secteur Petrolier aval : Guide des Investisseurs,								
	Mai, 2008, p. 20.							
Notes :								
(1)	Madagascar committed to the elimination of lead in gasoline effective January, 2006. However, leaded petrol							
	was / is allowed untill stocks of lead are eliminated.							
(2)	As in conventiona in East and Southern Africa LPG and (sometimes, but not in Madagascar) fuel oil are recorded							
	in tonnes but included in volumetric totals without any conversion.							

Annex Bibliography

Banaga-Baingi, Gerald. 2004. *Empirical Analysis of the Impact of Liberalisation on the Downstream petroleum Sector in Uganda.* MSc Dissertation. University of Warwick, Warwick.

BCEAO (Banque Centrale des Etats de l'Afrique de l'Ouest). 2007. "*Perspectives Economiques Des Etats De L'uemoa En 2007- Choc Petrolier Et Enjeux Energetiques*".

BMI Daily Oil and Gas Alert. 2009. "Kampala Considers Export Route Options." December 11.

BP. 2008. 2007 *Oil Consumption in Billion cubic metres*. BP Statistical Review of World Energy, June 2008. BP, London.

Coady, David et al. 2007. *Domestic Petroleum Product Prices and Subsidies: Recent Developments and Reform Strategies*. IMF Working Paper/07/71. Fiscal Affairs Dept. IMF. Washington, DC.

Conseil des investisseurs français en Afrique. 2009. *Harcèlement fiscal: léger mieux*. Jeune Afrique, 2505. Jeune Afrique, Paris.

Editor. 2008. *Uganda Inland Petroleum Sales*. Petroleum Insight, July-September, Petroleum Institute of East Africa, Nairobi.

Jeune Afrique. 2000. *Geographie, Superficie of Relevant Countries*. Atlas de L'Afrique. Le Groupe Jeune Afrique et les Editions du Jaguar, Paris.

Jones, Joseph and Murphy, Jeff. 2008. "*The risks are rising for Africa's private operators*". International Railway Journal, September.

Matthews, William and Zeissig, Dr. Hilmar. 2002. *Downstream Petroleum Sector in Sub-Saharan Africa*. Houston International Business Corp., April. Oil, Gas & Chemicals Dept., World Bank. Houston.

Matthews, William and Mostert, Wolfgang. 2000. *Oil Sector Liberalisation of Small Petroleum Markets in Africa* - The Experience. Frigo Consult. World Bank. Copenhagen.

Mitchell, Brigitta and Budin, Karim-Jacques. 1999. "*The Abidjan-Ouagadougou Railway Concession*". World Bank Group Findings, No. 140, August, 1999. Word Bank.

Nayar, T.S. 2006. *Landlocked East Africa: Petroleum Supply Logiostics and Future Security* (Draft). Africa Energy Unit. World Bank, Washington.

Sampson, Anthony. 1975. *The Seven Sisters*. Viking Press, New York.

Scherer, F.M. 1980. *Industrial Market Structure and Economic Performance* (Second Edition). Houghton Mifflin Company. Boston, Dallas, Geneva, ILL., Hopewell, N.J. Palo Alto.

Sexsmith, Fred. 1997. *Restructuration de la SONIDEP*. Downstream Oil Advisors Ltd. Cellule de coordination du programme de privatisation Gouv de Niger, Vancouver.

Sexsmith, Fred. 1999. *Petroleum Product Price Setting Mechanisms in Cameroun, Moçambique, Sénégal, Tanzania and Zimbabwe*. Nordic Consulting Group, Oslo.

Sexsmith, Fred. 2000. *Regulation of the Downstream Oil Sector in Sub-Saharan Africa*. Nordic Consulting Group, Oslo,

Sexsmith, Fred. 2002. *Contexte et processus de privatisation de la SONIDEP*. Downstream Oil Advisors Ltd. & F.C.A. Fiduciaire. Cellule de coordination du programme de privatisation Gouv de Niger, Vancouver.

Sexsmith, Fred. 2005. *Review of Zambia's Petroleum Product Import Parity Pricing Formula. Downstream Oil Advisors Ltd*. Indeni Petroleum Refinery Co. Ltd. Vancouver.

Sexsmith, Fred. 2006. *Revue de la structure des prix et d'autres décrets d'application de la loi 98-31*. Downstream Oil Advisors Ltd. Ministère de l'Énergie et des Mines, Dakar, Sénégal. Vancouver.

Sexsmith, Fred. 2007. *Review of the Côte d'Ivoire's Energy Sector*. Downstream Oil Advisors Ltd. Vancouver.

Sexsmith, Fred. 2008. *Partial Report information on Côte d'Ivoire Downstream Oil Sector*, Chaps II,III, V. Downstream Oil Advisors Ltd. IMF?. Vancouver.

Twodo, Ben. 2005. *The Kenya-Uganda Oil Pipeline Project, Presentation to Investors*. Commissioner of Petroleum. Ministry of Energy and Mineral Development, Uganda. New York.

UNCTAD. 1999. *Improvement Of Transit Transport Systems In Landlocked And Transit Developing Countries: Issues For Consideration. United Nations Conference on Trade and Development*. United Nations. New York.

World Bank. 2009. *Various Indicators. Global Macro Database*. World Bank. Washington, DC.

Zeissig, Dr. Hilmar. 2000. *Drafting of Downstream Petroleum Legislation and Regulations for the Republic of Uganda*. Energy Advisory Project, Uganda. Houston International Business Corp. Houston.

----------. *Advisory Services for the Implementation of a New Regulatory Framework for Downstream Petroleum*. 2005. Petroleum Development Consultants, Ltd. Ministry of Energy and Mineral Development, Uganda. London.

----------, "*Transrail SA (Mali)" abstract*. 2007. Jane's World Railways. Jane's Information Group.