

Oil Price Optimisation: The Case for Zambia

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ABSTRACT— The Minister of Energy of the Republic of Zambia Honourable Minister grew increasingly concerned about the financial losses from fuel supply chain in Zambia which led to mounting arrears to fuel suppliers and failure to settle the debt. Ministry of Energy was mandated to procure petroleum products and ensure security of supply through a self-financing and cost reflective mechanism, however the mechanism had proved unspecific because of high built-in costs, making its local pump prices among the highest in the Sub-Saharan Africa for both petrol and diesel at the pump.

Through a comprehensive review of contracts from the time the Open Account System was adopted as well as several cost elements that make up the pump prices and aligning them with internationally acceptable standards as per best practice, it was found that there would be approximately 24.2% and 27.6% reduction in the landed costs of petrol and diesel, respectively. For crude oil, standardization of the oil price margins resulted in an estimated saving of USD280.95/MT (15.59%). Further, the application of the proposed adjustments to the Cost-Plus Model, the pump prices of petrol and diesel decreased by an average of 8.91% and 9.94% respectively. As part of the findings, the losses were mainly caused by fluctuations in the international prices, failure to adhere to price adjustments and the depreciation of the Zambian Kwacha huge variances in contracts of suppliers. The need to have standardised contracts and renegotiate the contract prices was preeminent.

KEYWORDS— *standardisation of oil contracts margins, profitability and losses, oil infrastructure optimisation, automatic price adjustments, whole-sale price build-up, renegotiation of supply contracts*

1 LEARNING OUTCOMES

This case study will create the base for a half-day discussion to help students:

- to understand the fuel supply chain in Zambia
- to understand the causes of the fuel losses in Zambia
- to understand the fuel financing mechanism in Zambia.
- to understand the key functional institutions of the fuel supply chain in Zambia
- to understand the policy development challenge that the protagonist was facing.
- to understand the fuel pricing mechanism in Zambia and surrounding regional countries.
- to understand the pump price build-up of fuel in Zambia
- to understand the standardisation of the cost in the wholesale price build up

2 CASE SUMMARY

The Honourable Matthew Nkhwa was appointed to run the Ministry of Energy, Zambia in February 2018 by His Excellency the President of the Republic of Zambia Dr Edgar Chagwa Lungu. The Minister had inherited from his predecessors a backlog of debt; a failing self-financing procurement mechanism of fuel that resulted into financial losses and mounting arrears to

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the companies contracted to supply petroleum products to the country.

However, mounting arrears and failure to sustain the self-financing mechanism of fuel procurement in the country led to questioning the efficiency of a cost reflective pricing mechanism and its built-in costs, which made local pump prices for petrol and diesel among the highest in the Sub-Saharan Africa.

In June 2018, the Minister of Energy of the Republic of Zambia Honourable Matthew Nkhwa, called and hosted a stakeholder meeting with petroleum subsector officials from the Energy Regulation Board, TAZAMA pipelines, INDENI Refinery and Ministry of Energy (MoE) to deliberate on matters surrounding the sector. The Minister hoped to engage the aforementioned in a discussion that would come up with solutions to mitigate the financial losses that the Government of Zambia was incurring from the importation of fuel, due to mounting pressure from parliament as to why the fuel prices were still amongst the highest in the Southern African region and come up with a debt settlement strategy to the arrears that had accrued to the suppliers of fuel products.

“If we do not handle this matter carefully it will indeed result in a catastrophe which will affect other areas of our economy”

the Minister echoed. The country's fuel prices were set using the Cost-Plus Methodology. His Ministry, the Ministry of Energy – Zambia, was mandated to procure petroleum products and ensure security of supply of fuel through a cost-reflective mechanism.² This entailed that, all things being equal, the cost of procuring petroleum products was to be reflected in their pricing and should allow for at best, zero profit and no losses.

The Honourable Minister needed some ideas to use and a guide towards establishing optimal fuel prices that were based on an efficient self-financing mechanism of procuring fuel to avoid financial losses going forward as well as a debt settlement strategy to pay-off the debt that was owed by the Gov-

ernment. The available data for the previous two and a half years from January 2017 to September 2018 suggest that Government owed millions of dollars to suppliers over the interim mostly arising from the financial losses incurred as shown in Exhibit 6 and 7. The supplied fuel had already been sold on the Zambian market and the revenue realised from the sale of the fuel had been paid by buyers. However, the Ministry still recorded a backlog of debt which reviewed financial losses and perhaps inefficiencies in the system.

In his ministerial parliamentary statement in June 2019 following concerns from the public on high fuel prices he said:

*"Madam, my Ministry, in consultation with the Energy Regulation Board (ERB) is making tireless efforts to reduce fuel prices. However, the Government cannot prevent the price of petroleum products from increasing or reducing but can only optimize and revise its price build-up costs in liaison with other stakeholders. Further, the Government is currently looking at models which can benefit the Zambian people to ensure optimal prices. I thank you, Madam Speaker."*ⁱ

3 BACKGROUND OF FUEL PRICING IN ZAMBIA

The Ministry of Energy was founded in 2014 after separation of the Ministry of Energy and Water Development by a presidential directive. The Ministry of Energy would solely handle energy issues consisting of the electricity, renewable and petroleum sub-sectors. The Ministry of Energy was mandated to procure sufficient, affordable, and environmentally friendly petroleum products. The pricing was done by the regulator, the Energy Regulation Board (ERB), under the supervision of the Ministry. Prior to establishment of the ERB, setting of prices was done through the Government owned Zambia National Oil Company (ZNOC). After 1998, ERB took over the pricing function and in 1999 introduced price caps on petroleum products. This model of pricing was used until 2001 when Government liberalised pump prices. In 2004, ERB started using the Import Parity Pricing (IPP) model prices.⁴ and prior to April 2004, there were concerns from the stakeholders on the appropriateness of the Cost-Plus Model (CPM) as the fuel pricing mechanism. The two main concerns were:

(i) The price of condensate, which was one of the components of the petroleum feedstock, could not be independently authenticated using information from price reporting agencies such as Platts and Argus.

(ii) The model did not provide an incentive for the major players in the supply chain to be cost-effective.

In 2008, the ERB discontinued using IPP following complaints from stakeholders of frequent price reviews which could not support their budgets and re-introduced the CPM in fuel pricing. The use of the IPP methodology presented challenges in forecasting and budgeting of fuel prices for business entities and the public.

In response to this and to promote price stability on the market, the ERB adopted the CPM for pricing of petroleum products which was the model being used to date.⁵ Under the CPM, wholesale and pump prices would hold until a cargo

was depleted. Therefore, prices would hold for a relatively long time. In terms of risk management, under the CPM, the major risk to the price changing was the movements in the exchange rate and international oil prices. The Cost Plus was preferred because it ensured that all the costs of players in the supply chain were covered.

The Cost-Plus Pricing Model (CPM) operated on the principle that the final price of petroleum products should cover all costs in the supply chain. The model relied largely on information provided by the importer (Ministry of Energy), mainly through the invoices and other known standard costs in the supply chain. The application of the CPM was done whenever petroleum feedstock was imported into the country. As such, imports of finished petroleum products were also subjected to the model to derive the applicable wholesale and pump prices. This model was illustrated in Exhibit 8. On average, petroleum feedstock was imported every forty-five (45) days. Therefore, the frequency of price reviews was also tied to the number of times that petroleum feedstock cargoes were imported. The cost elements in the model were divided into two groups of elements which are: (i) Wholesale price build up (ii) Pump Price build-up.⁶

To ensure that the price of fuel became cheaper prior to implementing an open account system, government introduced a subsidy on fuel. The fuel subsidy was introduced in Zambia largely to offset the effect of the international oil prices which sharply escalated upward in 2008. The action by Government was deemed necessary to keep fuel pump prices affordable and sustain production primarily for industries for which fuel was a key input and protect the poor who were worst affected by a general price increase.ⁱⁱ

On 30th April 2013, the Government of Zambia decided to reform the petroleum sub-sector by removing Government subsidy on fuel. The Zambian government had been using the fuel subsidy to cushion consumers from high and often volatile fuel costs for various household uses. The reasons that were normally given to support the need for subsidies by governments include a desire to tame fuel-price induced inflation, the need to support industries, and the fact that fuel subsidies can be used as a fiscal tool or instrument to cushion vulnerable sections of the society from high fuel costs.

At the time the subsidy was removed, the Government had spent over K50 billion (~US\$50 million) in April 2013, which was projected to rise to K1.2 trillion (~US\$1.2 billion) by year-end, representing 3.4 percent of the 2013 total budget. As such, the subsidy had a crowding-out effect on growth-enhancing social and capital investments. This view was also shared by the International Monetary Fund⁸ (IMF) (2013b), which noted that subsidies were a problem in practically every country in the world, as they take up a significant amount of a country's revenues. In 2011, it was estimated that subsidies amounted to US\$1.9 trillion, about 2.5% of global Gross Domestic Product (GDP), or 8 percent of all governments revenues, (IMF 2013b) Prior to the enactment of the open account system, the Letter of credit system was being used and losses primarily came

from foreign exchange losses due to delays in opening letters of credit which meant that the PTA Bank debt kept increasing. By the year 2014 the debt from PTA Bank had increased to 550 million United States Dollars. With government buying fuel at higher prices and selling at lower ones, the increment in demand for fuel made this undertaking unsustainable. According to the Ministry of Finance, in 2016 fuel subsidies alone were projected to be around US\$600million and due to limited resources, Government accumulated fuel arrears of over K5.4 billion (~US\$400million) between 2009 and 2016. Further, the Government was spending about K1.5 billion (~US\$100Million) in quarterly payments on fuel arrears.ⁱⁱⁱ This clearly was a huge burden on the treasury and compromised the government's ability to deliver other social services as well as developmental projects.

In this regard, there was the need to come up with an efficient self-financing fuel procurement system with optimized price to reduce the risk of government involvement in subsidies from a Zambian perspective and ensure an accurate economic value of fuel for the Zambian people. In addressing the stakeholder meeting held on 12th June 2019 with several stakeholders present, the Honourable Minister said the following:

I am sceptical about the optimality of the fuel pricing mechanism that we have been using over the years. There was no doubt that CPM was the preferred pricing mechanism to the IPP as it holds prices steady for longer period. However, I wonder if there could be a better way to manage and implement it to ensure optimal fuel prices that are competitive, cost-reflective and help mitigate the financial losses that government was incurring. My biggest concerns are preventing financial losses going forward and giving the Zambian people the best possible price for this vital commodity. The smooth function of the economy depends on it. I understand we have little control over fuel price on the international markets as well as the exchange rate. Therefore, I wonder if there are other cost elements in the price build up that should be ³ scrutinised. Are we using the right pricing benchmarks as per international best practices?¹⁰⁴

4 THE FUEL SUPPLY CHAIN

In accordance with the 2019 National Energy Policy, the objective of the Government was to ensure the development and management of the petroleum industry to ensure the security of supply. Zambia had no known proven reserves of crude oil and depended entirely on the importation of petroleum products to satisfy fuel needs for supporting economic activities. Importation of petroleum products into the country was in two modes namely, feedstock importation through the TAZAMA pipeline for refining at INDENI Petroleum Refinery and importation of finished petroleum products through road tankers and rail wagons.¹¹

Commingled feedstocks: The 40% of the country's petroleum needs were met from refining commingled feedstock at INDENI refinery in Ndola. The petroleum feedstock imported was specifically tailored to the configuration of the Refinery

and was best suited to meeting the needs of the Zambian market. The Refinery was not configured to process pure crude oil but instead configured to process a spiked or commingled feedstock typically comprising pure crude oil, condensate, naphtha, and gas oil (diesel) pumped from Dar-es-Salaam in Tanzania through a 1,710-kilometre Tazama Pipeline to Ndola in Zambia. The pipeline had a capacity that matched that of the refinery. Its capacity was 113,225 cubic meters with a maximum throughput of 1.1 million metric tonnes per year.

Finished Petroleum Products: Considering that INDENI Refinery only met 40% of the country's fuel consumption requirements, the Government imported finished petroleum products to supplement INDENI Refinery products. To this end, the Government contracted suppliers of finished petroleum products to supplement the INDENI Refinery products and to supply products during the time of the refinery routine maintenance shut down. (Ministry of Energy).

Storage: The finished products from the refinery were pumped to Ndola Fuel Terminal. This fuel terminal was owned by the TAZAMA Petroleum Products Limited. While finished petroleum products that were imported were taken to storage facilities across the country including Ndola, Solwezi, Mpika, Lusaka and Mongu fuel depots. The storage facilities and their corresponding capacities are illustrated in Exhibit 4. The average storage loss at the terminal was about 0.3% by weight.

Road Tank Transportation: Road tank vehicles uplifted petroleum products from the fuel depots and Private transport companies that owned these vehicles. The transporters uplifted the petroleum products on contract with the Oil Marketing Companies (OMCs). A small percentage of petroleum products were uplifted from Ndola Fuel Terminal using rail tank wagons. The levels of losses of petroleum products during transportation did not have a bearing on the pump-price.

Distribution: Fuel was distributed by (OMCs) to either client's location or through retail sales at fuel filling stations. All the OMCs were privately owned and most of them owned several storage depots and service stations and supplied fuel in bulk to commercial customers mostly in the mining sector.

5 FINANCING OF FUEL

Following the removal of government subsidies, a cost-reflective pricing mechanism was adopted. Further, the financing mechanism employed was that of the open account where government contracted suppliers of petroleum products (commingled feedstock and finished products), procured the product using their finances and delivered to Government Bulk Fuel Depots. This fuel was then uplifted by oil marketing companies who bought the fuel in the local currency by depositing funds into an ESCROW Account. The funds were later converted into the United States Dollars and used to pay government suppliers for the products delivered to government depots.¹²

6 FUEL PRICING MECHANISM IN THE SADC⁵ REGION

The fuel pricing methodology in Botswana, Malawi, Namibia, South Africa, Tanzania, and Zimbabwe was based on import parity pricing. In Uganda, the price of petroleum products was not regulated.

Most countries in the Southern Africa Development Community (SADC) have selected domestic fuel pricing mechanisms based on the specific needs of each country. All the countries in Exhibit no.2 import finished petroleum products as they do not have refineries (except for South Africa). Thus, they require a pricing mechanism that prices petroleum products based on the global markets from which the finished petroleum products are procured from. This was not the case with Zambia which also had a refinery. This conditionality also applies to Angola which produced oil had a refinery in its capital Luanda hence pricing was based or dependant on the presence of a refinery.

The basic forms of fuel pricing globally were adhoc pricing where prices were set irregularly with no transparency and was common in countries that had own oil resources hence highly subsidized. It was an illusion keeping the prices constant even when the markets are bullish, hoping that the prices will go down. The formula based or automatic pricing adjustments was where prices were published (but not the formulas in some countries) for example south Africa publishes both prices and the formula. In liberalized pricing system where the market set the prices (depoliticized) was formula based for example in Australia. The Import parity principle (IPP) used by most countries in the Sahara region was defined as the price that a purchaser pays or can expect to pay for imported goods i.e., thus the Cost Insurance Freight (C.I.F.) import price plus trade tariff plus transport cost to the purchaser's location (ERB report 2013). The Basic fuel price was based on the import parity pricing principle which was cost an importer of petrol buys the petrol from an international refinery, transport the product from that refinery, insure the product against losses at sea and land the product on shores. The Cost-plus model was the cost-plus pricing was a cost-based method for setting the prices of fuel. Under this approach, you added together the direct material cost, direct labour cost, and overhead costs for a product, and added to it a mark-up percentage (to create a profit margin) to derive the price of the product. (See exhibit 2)

There was a substantial difference in the prices of petroleum products in different countries. As a rule, richer countries tended to have higher prices while poorer countries and the countries that produce and export oil have significantly lower prices. One notable exception was the U.S. which was an economically advanced country but had low gasoline prices. The differences in prices across countries were due to the various taxes and subsidies for diesel. All countries had access to the same petroleum prices of international markets but then decided to impose different taxes. As a result, the retail price of finished petroleum products was different from country to country.

According to Energy Sector Report of 2016, the fuel pricing

mechanisms of Zambia and the following countries: Malawi, South Africa, Tanzania, Botswana, and Zimbabwe, in general, revealed that the price of fuel in Zambia was higher than other countries in the region. This was because generally Zambia transports fuel by road and this tended to have higher prices than those countries who transported the product by pipeline such as Zimbabwe and that Zambia was further to the seaport, while countries that were on or closer to the coastline such as Tanzania had lower costs of transporting petroleum products.^{iv}

7 CURRENT ISSUES

The profitability of commingled feedstock

To maintain anonymity and the confidentiality of the preceding information on the supply schedules which was vital to the objective of the case, the names of the companies contracted to supply fuel to Zambia are coded as Supplier A, Supplier B, Supplier C, Supplier D, Supplier E, Supplier F, Supplier G, Supplier H, and Supplier I.

Zambia entered into a commingled feedstock supply agreement with Supplier A on 3rd February 2016 for the supply of 1,440,000MT of comingled feedstock. Supplier A delivered fifteen cargoes that incurred a total net loss of US\$51.98 million and out of the 15 cargoes, only 4 cargoes posted profits.^v According to the Energy Regulation Board, the losses in the cargoes were mainly attributed to:

The depreciation of the Kwacha against the US dollar. An analysis revealed that for cargo number 14 MT Samman a depreciation of 10.5% in the exchange rate from the K9.23/US\$1 used in the price review to K10.2/US\$1, increased the deficit by US\$8.7 million. This means that the actual loss of US\$10.1 million was mainly caused by the depreciation of the Kwacha against the US dollar.

The variations between the theoretical petroleum product yields and the actual production yields for the petroleum feedstock cargoes sometimes resulted in losses, especially where lower value products such as Heavy Fuel Oil (HFO) are produced at the expense of higher-value products such as diesel. The high production of low-value HFO at the expense of high-value diesel resulted in cargo 13 incurring a loss of US\$5 million from a projected profit of US\$4 million.

The Cost-Insurance-Freight (CIF) invoice value in most cases was higher than the CIF proforma, for cargo11, hence the figure increased by US\$2.2 million from US\$65.4 million on the proforma to US\$67.6 million on the final invoice, these variations contributed to the losses.

To ensure profitability the ERB adjusted prices when there was an increase in the aggregate cost of fuel importation when 2.5% trigger band was reached. In certain instances, the prices were not adjusted despite trigger band being exceeded. This was the case for cargo Number 8, cargo Number 10, and cargo Number 15.

Interrogating the viability of INDENI refinery

The INDENI Refinery produced 650,000MT of product per annum and accounted for 40% of the national demand for petrol and diesel. In addition, the refinery also produced HFO, Jet-A1, kerosene, bitumen, and Liquefied Petroleum Gas which were energy sources critical to the economy.

The operations at INDENI Refinery were deemed to be suboptimal and yielded little to no results about helping sustain the overall petroleum subsector. The refinery incurred huge losses from the refining of the commingled feedstock which was costly and had low production yields. While INDENI retaliated that, to contribute positively to the petroleum sector, INDENI needed to leverage the economies of scale and increase its production capacity from 650,000 MT to 1,100,000 MT. INDENI also needed to begin to refine pure sour crude oil that was cheaper by installing a hydrocracker and a de-sulphuriser by 2022 to meet the requirement to produce low sulphur gasoil as agreed by the Southern Africa Development Community (SADC) Council of Ministers. The modernization of the refinery would also reduce refinery consumption and losses from 8.5% to 6.5% making it competitive in ex-refinery product costs to attract exports to other countries. However, the undertaking to modernize the refinery required a huge capital injection that the government could not afford due to the existing fiscal challenges and tight budgets at that time.^{vi}(Ministry of Energy Annual Report, 2018).

Given the INDENI Refinery was operating below its design capacity (59%) and was unmodernized, the Ministry considered decommissioning the refinery and turn it into a storage facility for bulk petroleum products. If INDENI was decommissioned, it was expected that only a few employees out of the 345 will be returned to maintain the new depot, and as such, severance payments will have had to be paid out. However, there was need to explore the possibility of deploying some of the workforces to other depots. In addition, the other products of the Refinery i.e., Butane/LPG, Jet, Kerosene, HFO, and Bitumen would have to be imported by road or rail which had other implications on costs and reliability.

If INDENI was transformed into a storage depot, all the products currently being produced by INDENI could be imported and stored at INDENI. However, INDENI could only offload about 15-20 tankers of petrol if all its offloading meters were functioning. The uplifts could not be done at INDENI and as such, there was the need to upgrade the infrastructure as required. The estimated cost of maintenance for INDENI as a storage depot would then be US\$2/MT and throughput at K25/m³. (Ministry of Energy, Profitability report, June 2019).

Transportation of diesel through Tazama Pipeline

If INDENI Refinery was decommissioned, the option to transport diesel through the pipeline that was used to transport commingled feedstock to the refinery was explored. While the TAZAMA pipeline in its state at the time could not pump multi-products such diesel, petrol, and Jet-A1 at the same time. The preferred product to pump was diesel given that it had the highest demand and was a major input in the

industry sector, specifically copper production. Hence petrol and other products could be delivered into the country through road and rail by the suppliers or Oil Marketing Companies (OMCs). (Energy Sector Report, 2018).

If the pipeline were to be used to pump diesel, there would be a need to perform line cleaning done by way of running appropriate pigs using the imported diesel to push out the spiked crude oil by creating a controlled interface between the crude and diesel. The contaminated material coming from pipeline cleaning could be pumped to the refinery for separation. Since the line was not 'dirty', this process could take between 45 and 50 days. (Study on the Supply of Petroleum products, 2014).

Profitability assessment of finished petroleum Products

Considering that INDENI Refinery only met 40% of the country's fuel consumption requirements, the Government was left with little choice but to continue with the importation of finished petroleum products to supplement INDENI Refinery products. To this end, the government contracted eight suppliers for finished petroleum products to supplement the INDENI Refinery products. To maintain anonymity and the confidentiality of the preceding information on the supply schedules which was vital to the objective of the case, the names of the eight additional suppliers are expressed as Supplier B, Supplier C, Supplier D, Supplier E, Supplier F, Supplier G, Supplier H, and Supplier I. The Honourable Minister had requested that an assessment of the profitability of the finished products be conducted. Generally, the finished petroleum products yielded a net profit of US\$ 166.6 million for the considered period with petrol posting a net profit of US\$ 91.6 million and diesel posting a profit of US\$ 75.0 million.

A closer look into the periods when the losses were recorded led to findings that the losses were mainly caused by fluctuations in the international prices, failure to adhere to price adjustments and the depreciation of the Zambian Kwacha. (See Exhibit 6)

Non-standardization of cost builds up elements.

Government engaged suppliers of finished petroleum products through an open bid tender process. Contracts were awarded to bidders offering lowest prices at which fuel can be delivered to government fuel depots. The definition of "lowest

prices” was limited to a degree in that it only compared offers by bidders and had not had a hard-set benchmark against which the offers can be measured.

The Ministry considered a review of the fuel supply contracts, critically interrogating the price schedules of the various suppliers to come up with a standardized pricing schedule. The Minister was hence provided access to the supplier invoices of the eight suppliers contracted by the government. After quick review, the suppliers’ price schedules indicated that there were variations in landed costs whilst the cost lines were similar for all the suppliers. The variances on each of the cost lines suggested that the definitions of what constitutes these cost lines may not be similar. He also requested to know if there was a benchmark on which these prices could be set and impact, they would have on the actual pump prices.

Discussion for students

The Honourable Minister needed to consider the following issues on how he could establish optimal fuel prices that were based on an efficient self-financing mechanism of procuring fuel to avoid financial losses going forward as well as a come up with a debt settlement strategy to pay-off the debt that was owed by the government to its suppliers:

1. Why was the pump price of fuel in Zambia high as compared to other countries in the region?
2. What were the notable inefficiencies in the fuel supply chain in Zambia that are leading to the financial losses?
3. To optimize the oil price, what was the impact of effecting standard cost lines in the supplier price schedules and reducing cost line in the Cost-Plus Model as per international best practices?
4. Other than standardisation of the cost lines in the landed cost of fuel, what forms of intervention should government needed to put in place to reduce the losses on the imported finished products and commingled feedstock?

Biography of the protagonist

The Honourable Minister was appointed Minister of Energy by President Edgar Chagwa Lungu of the Republic of Zambia. Prior to his becoming Minister of En-

ergy, he served as Minister of Works and Supply. The Honourable Minister was also a Member of Parliament for Chingola on the Copperbelt Province of Zambia. In that capacity he had served on various parliamentary committees including the committee on legal affairs, Human Rights, National Guidance, Gender and Governance. He holds a BA in Project Management and Automotive Repair.

Exhibit 1 wholesale price build-up.

COST ELEMENT	UNIT COST	BASIS
Cost-Insurance-Freight (US\$/MT)	----	Contract/Supplier Invoice
Ocean Losses	0.30%	Best Practice
Wharfage	1.25%	Statutory fee Tanzanian Harbour Authority
Insurance	0.11%	Insurer
TAZAMA Storage Fee (US\$/MT)	2.00	TAZAMA
TAZAMA Pumping Fee (US\$/MT)	54.00	Approved ERB Pumping Tariff
TAZAMA Pipeline Losses (pipeline consumption of 0.83% & allowable pumping losses of 0.65%)	0.85%	Guided by MoE
Agency Fee (US\$/MT)	5.00	Agency Agreement
Refinery Fee (US\$/MT)	60.38	Approved ERB Processing Fee
Refinery Processing Losses	6.5%	Guided by MoE
Terminal Losses (1% for LPG, 0.5% for Petrol Kerosene & Jet A-1, 0.3% for diesel & HFO)	1%, 0.5%, 0.3%	Best Practice

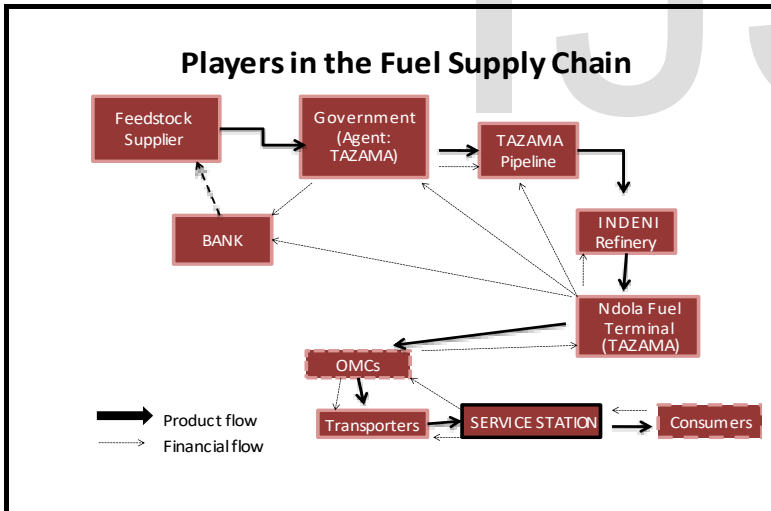
Source: Energy Regulation Board, Fuel Pricing Mechanism in Zambia, May 2020

Exhibit 2 Fuel pricing mechanisms in other countries in the region.

Country	Name of Pricing Method	Type of Pricing Method
Botswana	Basic Fuel Price Methodology	Import Parity Pricing
Malawi	Automatic Pricing Mechanism	Import Parity Pricing
Namibia	Basic Fuel Price Methodology	Import Parity Pricing
South Africa	Basic Fuel Price Methodology	Import Parity Pricing
Tanzania	Petroleum Products Pricing Formula	Import Parity Pricing
Uganda	Unregulated	-
Zambia	Cost Plus Methodology	Cost Plus Model
Zimbabwe	Unnamed	Import Parity Pricing

Source: Energy Regulation Board, Fuel Pricing Mechanism in Zambia, May 2020

Exhibit 3: Fuel supply chain in Zambia



1Energy Regulation Board, Fuel Pricing, Mechanism in Zambia, May 2020

Key:

- Existing Fuel Depots
- Fuel Depots To Be Constructed

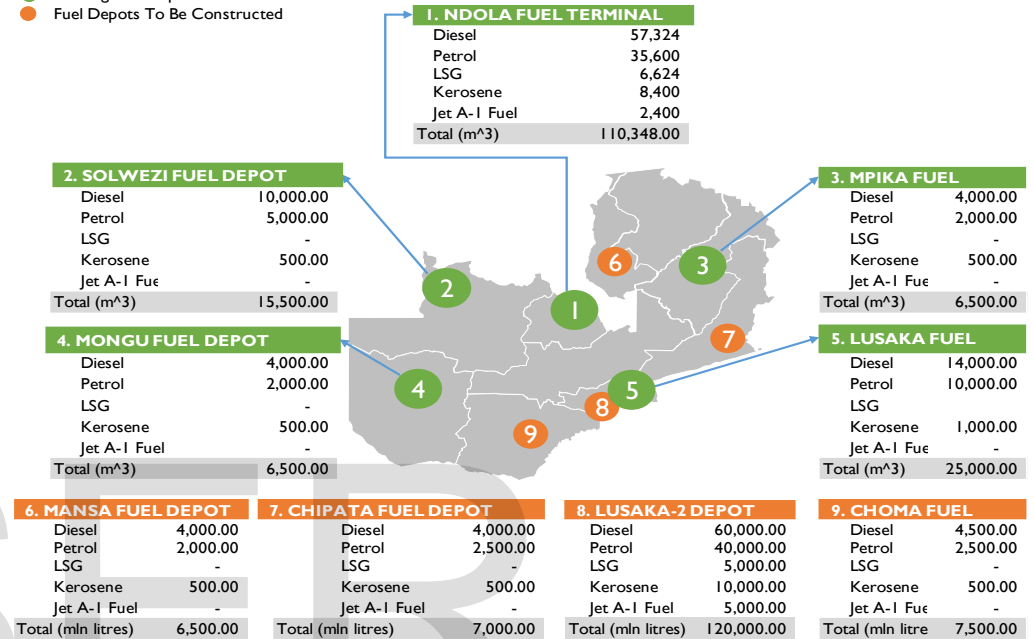


Exhibit 4: Fuel Storage depots across the country

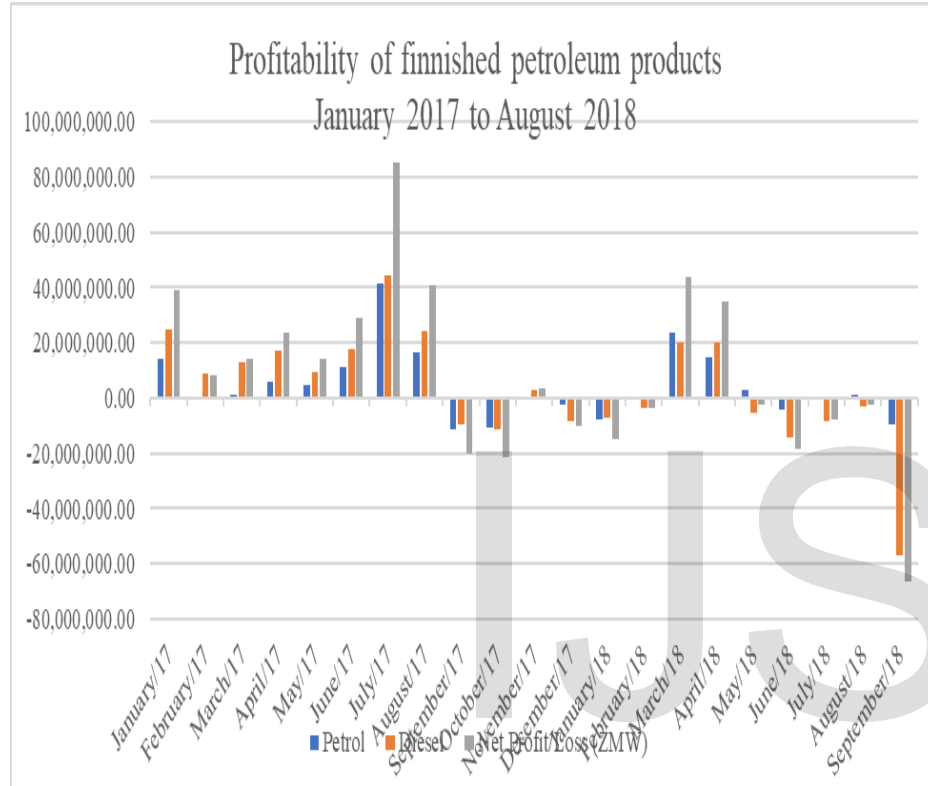
Source: Ministry of Energy, Petro din Database, accessed in May 2020

Exhibit 5: Illustration of costs incurred from the Port in Dar-es-Salaam to the Ndola Fuel Terminal and proposed benchmarks below.

COST ELEMENT	CURRENT UNIT COST	CURRENT BENCHMARK	OPTIMISATION BENCHMARK AND COMMENTS
Cost-Marine Insurance-Freight (US\$/MT)	-----	Contract/Supplier Invoice	Seasonal contracts to utilise the seasonal benefits of lower prices and withdraw when prices are high. Standardise marine insurance. freight to be standardised or seek hiring of actual ships to cut off the middleman
Wharfage	1.25%	Tanzanian Harbour Authority	Hold bilateral talks with Tanzanian government to waive off fees.
Pipeline Insurance	0.11%	Insurer	Utilise real premium from the Pensions and Insurance Authority in Zambia
TAZAMA Storage Fee (US\$/MT)	2.00	TAZAMA	Adopted
TAZAMA Pumping Fee (US\$/MT)	54	Approved ERB Pumping Tariff	Global search as per best practise is at 37.50 USD/MT
TAZAMA Pipeline Losses (<i>pipeline consumption of 0.83% & allowable pumping losses of 0.65%</i>)	0.85% 0.65%	Guided by MoE	Standard practice is the reduction in delivered quantities of contract which is not the case. Needs to be subtracted also from current pumping fees and nullified.
Agency Fee (US\$/MT)	5.00	Agency Agreement	Global search as per best practise
Refinery Fee (US\$/MT)	60.38	Approved ERB Processing Fee	Standard practise, global best practise at 30 USD/MT for such refineries.
Refinery Processing Losses	6.75%	Guided by MoE	Standard practise is to deduct from current refinery margins and hence cost nullification
Terminal Losses (<i>1% for LPG, 0.5% for Petrol Kerosene & Jet A-1, 0.3% for diesel & HFO</i>)	1% 0.5% 0.3%	Best Practice	Standard practise is that losses are assimilated in the service charge to agent through the pumping costs and not to be borne by consumer

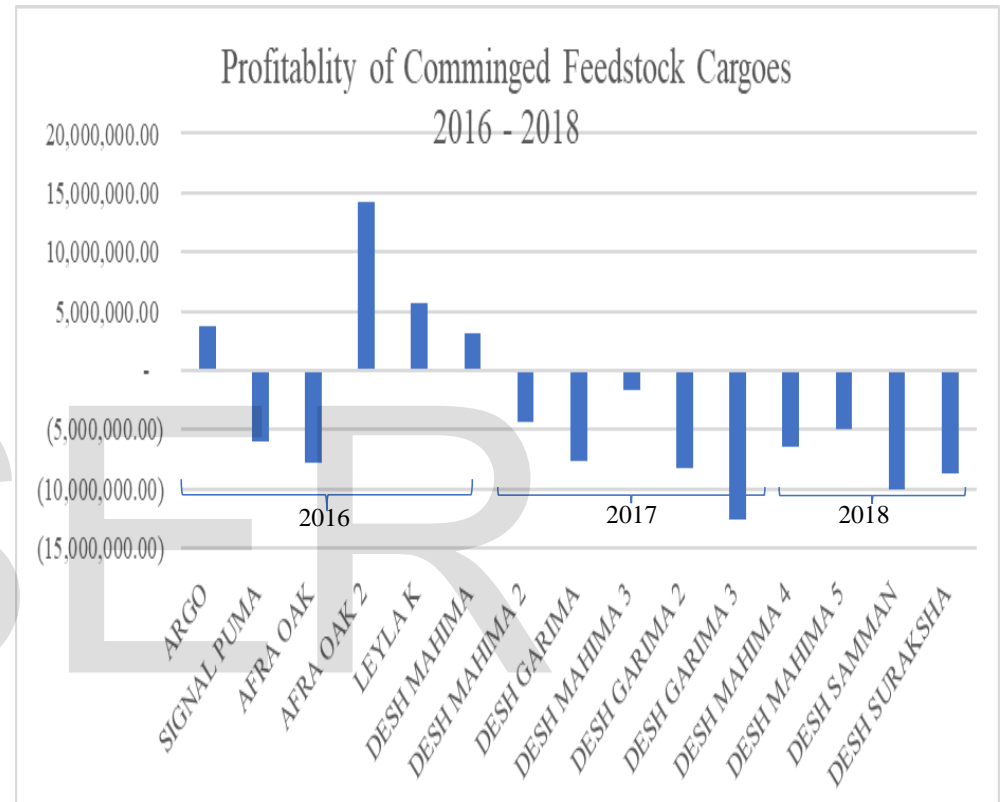
Source: Energy Regulation Board, Profitability Assessment of the Fuel Supply Chain, accessed in June 2020.

Exhibit 6: Illustration of costs incurred from the Port in Dar-es-Salaam to the Ndola Fuel Terminal and proposed benchmarks.



Source: Ministry of Energy, Profitability Report 2019, accessed in May 2020

Exhibit 7: Illustration of costs incurred from the Port in Dar-es-Salaam to the Ndola Fuel Terminal and proposed benchmarks.



Source: Ministry of Energy, Profitability Report 2019, accessed in May 2020

ENDNOTE

- ¹ “National Energy Policy 2019,” Ministry of Energy Website, https://www.moe.gov.zm/?page_id=4610, accessed May 2020.
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- ³ Energy Regulation Board, “Monthly Bulletin on Import Parity Pricing of Petroleum Products – January 2008,” 2008, <http://www.erb.org.zm/press/statements/IPP-Jan2008.pdf>, accessed June 2020.
- ⁴ United Nations Conference for Trade and Development, “The Petroleum Industry in Zambia: A study on the market structure and competition”, 2011, <https://unctad.org/node/14079>, accessed in April 2020.
- ⁵ Energy Regulation Board, “Fuel Pricing Mechanism in Zambia Report - February 2019”
- ⁶ CUTS International Zambia, “Understating the impact of the Removal of Fuel Subsidies on the Zambian Economy; A case Study of Lusaka and Western Provinces”, 2013, <https://cuts-lusaka.org/pdf/Project-Report-Impact-of-the-Removal-of-Fuel-Subsidies-in-the-Zambian-Economy.pdf>, accessed in May 2020
- ⁷ International Monetary Fund, “Zambia Selected Issues, IMF Country Report No. 17/328,” 2017, <https://www.imf.org/-/media/Files/Publications/CR/2017/cr17328.ashx>, accessed in June 2020.
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- ⁹ Energy Regulation Board, “Economic Regulation – Pricing of petroleum products”, The Energy Regulation Board website: <http://www.erb.org.zm/content.php?viewpage=erffi>, accessed in March 2020.
- ¹⁰ Ministry of Energy, “Ministerial Annual Report, 2018”
- ¹¹ Energy Regulation Board, “Energy Sector Reports 2016,” 2017, <http://www.erb.org.zm/content.php?viewpage=down>, accessed in March 2020.
- ¹² Ministry of Energy, “Assessment of the Profitability of the Fuel Supply 2019,”
- ¹³ Ministry of Energy, “Proposed Bulk Procurement System for Private Sector Participation (2020)”

TEACHING NOTE

Case Overview

The case examines the issues surrounding self-financing procurement mechanism of fuel in Zambia that resulted into financial losses and mounting arrears to the companies contracted to supply petroleum products. The Ministry of Energy of Zambia is mandated to procure petroleum products and ensure security of supply through a self-financing and cost-reflective mechanism. It is run by the Honourable Minister of Energy Matthew Nkhuwa who was appointed to run the Ministry in February, 2018 and inherited from his predecessors a backlog of debt.

The petroleum supply chain holistically including the financing mechanism, the viability of institutions in the petroleum supply chain and the political and social implications of the policy measures that may be proposed to address them. This case asks students to assess the various issues raised in the petroleum supply chain, what approach they would take to solve them with a focus on mitigating the financial losses, reducing costs, and setting up controls that allow for an efficient cost-reflective pricing mechanism.

However, mounting arrears and failure to sustain the self-financing mechanism of fuel procurement in the country leads to questioning the efficiency of a cost reflective pricing mechanism and its built-in costs, which makes local pump prices for petrol and diesel among the highest in the Sub-Saharan Africa.

In this case, I review and analyse all the problems that the petroleum supply chain with regards to Zambia faces and then generate ideas related to the application of analytical techniques in financial loss reduction through cost standardisation and policy initiatives that make functions of the institutions in the petroleum subsector more efficient.

Keywords: *standardisation of oil contracts margins, profitability and losses, oil infrastructure optimisation, automatic price adjustments, whole-sale price build-up, renegotiation of supply contracts.*

Potential Audience

This case is suitable for graduate level policy management course. It can be used toward the end of a module course in energy economics at postgraduate level. It can further be taught in undergraduate or MBA students in petroleum management, business and society or corporate social responsibility. The last two discussion areas can build on lessons from business strategy course.

The case can further be used in graduate level quantitative techniques or management science to demonstrate the use of spreadsheet-based optimization tool like Open solver.

Case Fit

The focus of this case falls under the broad disciplines of strategic management, strategic negotiation, and cross-cultural management. Strategic management has to do with the analysis of all alternative goal choices. The Honourable Minister must use strategic management thinking and principles to perform a cost-benefit analysis of the various issues relating to achieving price optimisation including an analysis of their strengths, weaknesses, opportunities, and threats.

Strategic negotiation refers to managing high-stakes and challenging negotiations and settling major disputes between two parties or in this case study, a multiparty conflict. The Honourable Minister must be adept at utilizing persuasive tactics and a results-driven business negotiation strategy to achieve the best outcomes. In the case of a multiparty conflict, he will need to use the optimum negotiation strategy to bring together the right players, tackle the right issues and develop the right process for each phase of the negotiation of a deal to yield maximum value for oil contracts renegotiation and meet the objective of losses prevention.

Teaching Objectives

The main objectives of this case are:

- Demonstrate the relationship between the financial losses incurred by the Government and the high fuel prices compared to other countries in the SADC region.
- Analyse the fuel supply chain in Zambia and explain the fuel financing mechanism.
- To perform quantitative situational analysis, including the modelling of profitability given various options.
- Identify oil price optimisation as a potentially powerful tactic and its use by oil traders and national oil companies.
- Understand oil price optimisation as a theory of change and counter arguments against it.
- Study the fuel pricing mechanism in Zambia and surrounding regional countries and financial losses incurred from fuel procurement and their causes and how optimal fuel pricing mechanism can be achieved through a comprehensive review of various cost lines that make up the Cost-Plus Model.
- Identify other options to achieve efficiency and profitability such as decommissioning of INDENI Refinery and transporting diesel through the pipeline.
- Demonstrate the impact of standardisation of the cost elements on the pump prices for petrol and diesel in Zambia.

The case highlights the importance of optimizing the fuel prices through the

standardisation of the cost elements in wholesale pump price build-up. It also highlights the inefficiencies in relation to the price of the fuel supply chain and the financing mechanism in place as well as their role in escalating prices. The inefficiencies in the refinery and assess the impact that continuing refining crude oil has on the overall pump price of the fuel. Further case demonstrates that standardisation of oil contracts margins can play a major role in optimising prices and re-aligning prices with other countries in SADC region.

The case further highlights why Zambia suffers from high petroleum pump prices after the removal of fuel subsidies in 2013. It demonstrates many issues that come with the removal of fuel subsidies and the adoption of a cost-reflective pricing mechanism. These issues include the foreign exchange losses, unstandardised oil price margins, non-adherence to strict price adjustment whenever the fundamentals in the fuel price build up change based on the concept of the cost-plus model where automatic price adjustment is to be affected once the 2.5% trigger band is exceeded.

Learners are expected to be able to assess the options available to come up with an optimal fuel price. They should discuss each option and state the advantages and disadvantages of each option and use both quantitative and or qualitative information. This is done by comprehensive review of the several cost elements that make up the pump prices and aligning them with internationally acceptable best practices. The case further shows that a reduction in the landed costs of petrol and diesel, respectively to the current oil contracts with the standardization of oil price margins. Further, with the application of the proposed adjustments to the CPM (Cost Plus Model), the pump prices of petrol and diesel is expected to decrease.

Related Readings

- "National Energy Policy 2019," Ministry of Energy Website, https://www.moe.gov.zm/?page_id=4610, Page 21
- Energy Regulation Board, "January 2008 - Monthly Bulletin on Import Parity Pricing of Petroleum Products," 2008, <http://www.erb.org.zm/press/statements/IPP-Jan2008.pdf>, accessed June 2020.
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- Energy Regulation Board, "Fuel Pricing Mechanism in Zambia" February 2019
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Discussion Points and Suggested Solution to Discussion Questions

Suggested questions to the discussion

1. Why is the pump price of fuel in Zambia high as compared to other countries in the region?
2. What are the notable inefficiencies in the petroleum supply chain in Zambia that are leading to the financial losses?
3. To optimize the oil price, what would be the impact of effecting standard cost lines in the supplier price schedules and reducing cost line in the Cost-Plus Model as per international best practices?
4. Other than standardisation of the cost lines in the landed cost of fuel, what forms of intervention should Government put in place to reduce the losses on the imported finished products and commingled feedstock?

Zambia has no proven reserves of fuel, therefore relies on the importation of petroleum products to meet its local fuel needs. As a rule, richer country tends to have higher prices while poorer countries and the countries that produce and export oil have significantly lower prices. One notable exception is the US which is an economically advanced country but has low gas prices. The differences in prices across countries are due to the various taxes and subsidies for gasoline and diesel. All countries have access to the same petroleum prices on the international markets but then decide to impose different taxes and pricing mechanisms. As a result, the retail price of gasoline and diesel is different. The pump price in Zambia is higher because its further away from the coast. For example, the average price of gasoline around the world as of 10th July 2017 was 1.02 USD per litre while diesel was at 0.89 USD per litre. While the local prices in Zambia were hovering around 1.32 USD/litre for petrol and 1.18 USD/litre.

Teaching Plan

The course can be taught in 105 minutes using the below teaching plan.

Introduction to the case	10 Minutes
Fuel Supply Chain in Zambia	15 Minutes
Fuel financing and financing mechanisms in Zambia	15 Minutes
Discussion of the viability of the following options: INDENI Petroleum Refinery Limited decommissioned Utilisation of pipeline for diesel transportation post decommissioning of the Refinery.	25 Minutes
Explain the proposed standardisation of supply cost-line (See exhibit 4&4)	20 Minutes
Compare pump prices with standardised and unstandardized cost elements	20 Minutes
Estimated Total Time	105 Minutes

This case can be discussed in a separate session in oil trading and oil market fundamentals course. The case can be used to demonstrate the practical difficulties faced by Governments in applying a cost reflective procurement mechanism of fuel amidst fluctuations in the international commodity prices, foreign exchange changing economic fundamentals and varying cost lines in fuel procurement. The class can begin with a discussion around the fuel supply chain in Zambia including the key functional institutions that participate in the procurement of fuel in Zambia. The students should be able to understand the roles of the Ministry of Energy (MoE), Energy Regulation Board (ERB), TAZAMA Petroleum Pipelines (TAZAMA), INDENI Refinery and the Oil Market Companies in the Zambian

an fuel supply chain. The instructor can explain to the leaners that MoE is responsible for the procurement of fuel products through the selection of suppliers; ERB sets price to petroleum products.

The instructor can then give a background on the fuel financing mechanism in Zambia and highlight the policy change, following the removal of subsidies in 2013 and the adoption of a cost-reflective mechanism to finance fuel procurement thereafter. The instructor can then explain the fuel pricing mechanism in Zambia which is based on the Cost-Plus Model. Thereafter the instructor can then initiate a discussion on the possible challenges that can be faced by policy makers in the implementation of the Cost-Plus Model including a general lag in price adjustments when economics fundamentals change as well as the different terms of engagement for fuel suppliers. The subsequent step is for the instructor to move the discussion to the effectiveness of the key functional institutions including the INDENI Refinery and the options to either continues its operation or decommission it.

The class can then focus the development of robust comparative analysis of the supplier contract price schedule. This should include deviations; averages and the students should conduct an analysis of the internal factors such as foreign exchange losses as well as the external factors such as the international oil prices and trade financing. The students should compare the several cost lines in the supplier's schedules with the recommended standardised costs margins.

The students can then compare the prices of fuel in Zambia with countries in the SADC Region and decommissioning of INDENI and the allowing OMCs to import petroleum products.

Suggested Question and Answers to Questions

Why is the pump price of fuel in Zambia high as compared to other countries in the region?

Possible Answers

High Inbuilt costs

The country employs a cost reflective pricing mechanism of fuel which has high built-in cost elements resulting in high oil prices for both petrol and diesel at the pump in comparison to other countries in the Sub-Saharan region.

Proximity to the Seaport

Zambia is a landlocked country; this means that the petroleum products must be transported over a long distance to reach storage facilities. This results into the government incurring much more cost as compared to other countries that are

near the seaports. For example, the distance from Dar -es -salaam to port to Ndo-la Fuel terminal in Zambia is about 1700 Kilometres.

Macroeconomic Factors

Some countries in the region have subsidies in the petroleum subsector as compared to Zambia which removed subsidies in 2013, this had resulted in the oil price to be lower than the price in Zambia. In addition, some taxes and levies in Zambia are ad- valorem rather than specific figures with the VAT being at 16%, the effect of the taxes in absolute amount added to the pump price is high compared to other countries. Further, Zambia has a relatively weak currency compared to other countries in the region and considering that crude oil and finished products are traded in United States dollars from the oil producing nations, the countries in the region with stronger currencies against the United States dollar will have lower fuel importation bill and hence lower fuel prices.

Pricing Method of Petroleum Products

Different types of pricing petroleum products also cause some countries to have lower pump prices as compared to other countries. The fuel pricing methodology in Botswana, Malawi, Namibia, South Africa, Tanzania, and Zimbabwe is based on import parity pricing. In Zambia, the pricing mechanism is cost plus model which does not respond immediately to changing fundamentals.

The model calculates the weighted averages of the wholesale prices for finished products (petrol and low sulphur diesel) that are required to be set to recover the cost of the finished products imported and the finished products produced by the Zambia's only commigled crude oil refinery.

Cost Elements

The specific cost elements affecting the pricing of fuel in Zambia are discussed below and are as follows.

Cost-Insurance-freight

The Cost-Insurance-Freight (CIF) of the petroleum feedstock cargo is the landed cost of the cargo at the port of Dar-es-Salaam. The quantities of the constituent components of the petroleum feedstock, which include crude oil, condensate, naphtha, and diesel, are multiplied by the unit costs to derive the total monetary cost of the feedstock. The information is obtained from the supplier invoices which is based on the contract between Government and the oil supplier and ultimately used to develop a profitability statement. To optimize costs, the cost elements on the supplier invoices should be standardized in accordance with the global best practise. The need to utilise seasonal contracts capitalise on seasonal

benefits of lower prices and withdrawals when prices are high for crude oil prices. Further, all other cost elements including marine insurance, financing and costs associated with the shipping of cargoes are to be standardised. This cost element is substantial in contracts hence success in optimisation is critical.

Free on Board (FOB)

Free on Board (FOB) is a shipment term used to indicate whether the seller or the buyer is liable for goods that are damaged or destroyed during shipping. "FOB shipping point" or "FOB origin" means the buyer is at risk and takes ownership of goods once the seller ships the product. To optimise this element the government needs to buy under a government-to-government bilateral framework to supply oil marketing companies locally and remove any middlemen as the official selling price (OSP) of the oil producing country is used as opposed to traders' price which is always higher.

Wharfage

The Tanzania Harbour Authority levies a statutory charge on the importation of petroleum products. At present, this is 1.25% of the CIF Dar-es-Salaam cost. To optimise this cost, there is need for the Zambian government to hold bilateral talks with the Tanzanian government to have this cost waived off or reduced.

Insurance

The insurance costs are set at 0.11% of CIF. The insurance covers the cost of insuring the feedstock from the Dar-es-Salaam to Ndola. To reduce the cost, there is need to utilise the real premium which is set by the Pensions and Insurance Authority of Zambia and essentially consider reduced rates for crude oil transportation.

TAZAMA Storage Fee

TAZAMA charges US\$2/MT to the importer for any petroleum feedstock quantities that are stored at the Dar-es-Salaam tank farm on the last day of the month. The amount was agreed upon between TAZAMA and Government and is in line with global averages which are between \$2 - \$5 per metric tonne.

TAZAMA Pumping Fee

TAZAMA charges US\$54.00/MT to the importer for transporting petroleum feedstock through the pipeline from the Dar-es-Salaam tank farm to the Refinery in Ndola. A search of the global average costs has reviewed that the pumping

fees ought to be at \$37.5/MT. Therefore, the Tazama pumping fee should be adjusted accordingly.

TAZAMA Pipeline Losses

Consumption and losses for TAZAMA are currently set at 0.85%. Standard practice is the reduction in delivered quantities from the contract which is not the case. There is need for the losses to be subtracted also from current pumping fees.

Agency Fee

The Government of Republic of Zambia (GRZ) appointed TAZAMA as agent to discharge specific duties in the procurement of petroleum feedstock. The Agency fee is currently US\$5/MT, the fee is agreed between the GRZ and the agent. The key function of the agent, amongst others, is to ensure compliance by the suppliers to the terms and conditions of the supply contract.

Processing Fee

INDENI charges a processing fee of US\$60.38/MT to the importer for refining (processing) petroleum feedstock. The standard processing fee is 30 USD/ MT for a hydro skimming refinery. This implies that the current processing fee should be adjusted accordingly.

Refinery Losses

The consumption and losses figure are set at 6.5%. There are some petroleum feedstock quantities lost during the refining process due to:
Normal processing losses: and consumption, as some quantities are consumed as fuel in the process. To optimise costs, the refinery losses should be subtracted from the refinery margins rather added to the price build-up of fuel. In other words, the losses should be removed from the price build up.

Terminal Losses

These are terminal losses as prescribed by international norms. A loss level of 0.5% is allowed for petrol, kerosene, and jet A-1; 0.3% for diesel and Heavy Fuel Oil (HFO) covering handling and storage losses. A loss of 1% is provided for liquefied petroleum gas (LPG). The losses arising from storage of fuel ought to be subtracted from contracts of quantities delivered and not included in the price build-up to optimise the contracts.

The proportion of imported finished petroleum products to imports of spiked crude had been on the increase. Up until 2013, 70% of the fuel consumed was from spiked crude while 30% was from imported finished products. From 2015 onwards around 60% of the fuel consumed by Zambia was from finished petroleum products and the remaining 40% from commingled crude.

The change was mainly attributed to an increase in consumption of petroleum products, demanding more imports of refined products as INDENI and TAZAMA Pipelines Limited could not immediately meet all the needs of fuel in the country due to old infrastructure.

What cost elements in the price build-up should be removed or revised to optimise the oil price?

Answer

- Aligning all the cost lines for finished petroleum products per international best practice or the cost line ensures that the nation gets value engineering for the prices of fuel.
- FOB: All suppliers will be referencing Platts Arabian Gulf as a maximum in that trading cycle however are at liberty to quote less than the price reporting agency's price.

Conversion Factors

¹(US\$ / bbl. to US\$/MT); 7.46 for Diesel, 8.35 for Petrol which is standard practice within SADC. The current contract are having huge variances in the contracts for suppliers hence no range should be allowed.

Freight

(USD 20.55 / MT of diesel and USD 20.55 / MT for petrol) in accordance with World scale rates from Arab Pacific to East Africa (Dar es Salaam and Beira) which also is higher in most government contracts.

Insurance

USD 0.94 / MT Diesel USD 1.00 / MT Petrol as 0.15% of the CIF according to international best practice. This is higher in most contract government contracts.

1

Most of the supplier margins have higher values in most government contracts see exhibits no. 8 and 9.

Supplier Margins

USD 24.408 / MT - Petrol and USD 5.836 / MT - Diesel, Regional practice is that margins are determined by competitive bidding with the lowest getting the tender as all other cost elements will be standard.

Ocean Losses (Nil) as the suppliers to cover ocean losses in the CIF.

Harbour fees: 1.25% of CIF, USD 4.98 / MT storage fee

Inspection Fees; USD 0.12 / MT

Financial Costs; 3% of CIF (i.e., 2.5% LIBOR + 0.5% margin)

Inland Transportation Costs: USD 170 / MT for Dar es Salaam, USD 150 / MT for Beira routes

For commingled feedstock, the cost lines constitute of:

FOB Official Selling Price (OSP) International Best Practice.

Ocean Freight

USD 20.55 / MT - Crude base, USD 20.55 / MT - Gas Oil, USD 20.55 / MT - Naphtha, the freight charge is based on World scale (2019) from Arab Gulf to East Africa (Dar es Salaam and Beira).

Insurance

USD 0.77 / MT Crude base, USD 0.87 / MT - Gas oil, USD 0.80 / MT - Naphtha as 0.15% of C&F based on international best practice.

Financial Costs

3% of CIF (i.e., 2.5% LIBOR + 0.5% margin). 2.5% is London Interbank Offered Rate (Rate at which banks lend to each other). The Margin is not fixed and may go up to 3% or 4% based on factors such as country risk.

Inspection Fees

USD 0.08 / MT - Crude base, USD 0.08 / MT - Gasoil, USD 0.08 / MT - Naphtha, Intertek

Ocean Losses

Zeroised as Government only takes custody at Single Point Mooring of all shipped products from Arab gulf at the Port in Tanzania.

Supplier Margins

USD 11.64 / MT - Crude base, USD 8.14 / MT - Gasoil, USD 8.04 / MT - Naphtha. International best practice is that this is not prescribed but competitive and goes to the lowest bidder and most government contracts have higher variables.

To optimize the oil price, what would be the impact of effecting standard cost lines in the supplier price schedules as per international best practices?

Possible Answers

Answer

Standardisation of the cost elements of the supplier price schedules result in a saving of approximately 24.2% and 27.6% in the landed costs of petrol and diesel, respectively. For crude oil, standardisation of the prices results in an estimated saving of USD280.95/MT (15.59%). Further, the application of the proposed adjustments to the CPM, the pump prices of petrol and diesel decrease by an average of 8.91% and 9.94% respectively.

Other than standardisation of the cost lines in the landed cost of fuel, what forms of interventions should Government put in place to reduce the losses on the imported finished products and commingled feedstock?

Answer: Government should consider direct importation of the finished petroleum products which is likely to be more economical. For example, Chipata is 900 km by road from Ndola but only 140 km from Lilongwe, the capital of Malawi. Given that Malawi has historically had significantly lower fuel costs than Zambia, Eastern Province may be able to procure fuel more cheaply through Malawi. In similar manner those on the western part of Zambia can import fuel from Angola which is the second oil producing after Nigeria in Africa. In addition, all the oil suppliers supplying bulk fuel should be allowed to supply directly to oil marketing companies hence government will not have the obligation to pay suppliers hence no losses.

The Energy Regulation Board (ERB) determines wholesale and pump prices of petroleum products using the Cost-Plus Pricing Model (CPM). The principle of the CPM is that the final price at the pump should cover all the costs incurred in the petroleum supply chain. The petroleum prices are reviewed for each petroleum feedstock cargo and finished petroleum products that are imported. The CPM, therefore, accounts for cost recovery for both imported petroleum feedstock and finished petroleum products.

While the pump prices were generally affected by exposure to volatile international oil prices and the weakening local currency against the United States Dollar, a review of the petroleum procurement processes and the cost elements in the pricing mechanism that was being employed indicated that there were other un-

derlying inefficiencies that contributed to a greater extent to continued financial losses which resulted to mounting debt to suppliers and continued increase in fuel pump prices.

For example, the INDENI Refinery is un-modernized and therefore operating under capacity. The refinery needed a huge capital injection for modernization which the government could not afford due to prevailing fiscal challenges. Further, government engaged suppliers of finished petroleum products through an open bid tender process. The contracts are awarded to bidders offering lowest prices at which fuel can be delivered to government fuel depots. However, the definition of "lowest prices" is to a limited degree in that it only compared offers by bidders and had not had a hard-set benchmark against which the offers can be measured. A quick review of the suppliers' price schedules indicated that even though definitions of cost lines were similar for all the suppliers, the quantum of their costs varies substantially. This prompted the need to standardise the definition of the cost lines and the quantum of the costs and setting hard benchmarks against which their value can be measured or matched. This revision of benchmarks will need a standardization committee to monthly review the wholesale price.

A closer look into the periods when the losses are recorded lead to review that the losses are mainly caused by fluctuations in the international prices, failure to adhere to strict price adjustments and the depreciation of the Zambian Kwacha.

Weighted Diesel Wholesale Price

The weighted average wholesale price of diesel is calculated as indicated below:

Expected Revenue from imported LSG (A) = Total quantity of Imported LSG X The landed unit cost CIF Ndola

Revenue expected from INDENI Diesel (B) = Expected Diesel yields from processed Cargo X Computed Diesel Wholesale price as per CPM

Weighted Average Wholesale Price (C) = $\frac{(A+B)}{\text{INDENI diesel yields LSG Import Quantity}}$

Weight Petrol Wholesale Price

The weighted average wholesale price of petrol is calculated as indicated below:

Expected Revenue from imported Petrol (D) = Total quantity of Imported Petrol X The landed unit cost CIF Ndola

Revenue expected from INDENI Petrol (E) = Expected Petrol yields from processed Cargo X Computed Petrol Wholesale price as per CPM

$$\text{Weighted Average Wholesale Price (F)} = \frac{(D+E)}{\text{INDENI Petrol yields} + \text{Petrol Import Quantity}}$$

September 2017 to October 2017

In the period above international oil prices increased by 2.23% while the Kwacha depreciated by 5.04% in July and further by 8.1% from August to September 2017. This was followed by a price revision by ERB from K11.67/litre to K12.97/litre for petrol and K9.07/litre to K11.09/litre for diesel effective October 2017.

December 2017 to February 2018

In this period above the Kwacha continued to depreciate against the USD dollar by about 2.15%, i.e., from an average rate of K9.97/US\$, while the international oil prices increased by an average of 9.05% from US\$58.10/barrel to US\$63.35/barrel. This was followed by a price adjustment of K13.75/litre from K12.97/litre for petrol and K11.09/litre to K12.01/litre for diesel to mitigate the losses in February 2018.

May 2018 to September 2018

During this period, the Kwacha depreciated on average by 26.29% and the international oil prices increased for petrol by 10.28% and 13.79% for diesel. This was followed by a price revision due to the 2.5% trigger band being exceeded. The prices increased from K13.75/litre to K16.06/litre petrol and diesel from K12.01/litre to K14.65/litre effective October 2018 to mitigate the losses.

Importation of Finished Petroleum Products by Oil Marketing Companies

INDENI Refinery had a planned annual 72 day shut-down period for maintenance. During the shutdown, the government engaged OMCs in the importation of finished Diesel and Petrol. However, the import tax for OMCs was waived for them to manage to import. In the long-term, if the OMCs are given leeway to import petroleum products, the government could encounter the following challenges among others:

- To maximize profits, OMCs exercise unfair competition among themselves such that they engage in selling adulterated diesel at low prices where diesel is usually mixed with kerosene.
- The quality of fuel and gas could be compromised as supplying quality products may not be a priority to OMCs. There could be increased

smuggling and fuel vending and as such the government making the task to account for sales difficult and therefore lose revenue.

Importation of fuel and gas by OMCs may lead to the formation of cartels to sabotage government if their price demands are not granted. This would lead to fuel shortages which would in turn compromise the security of supply and the economy at large.

(Energy Sector Report, 2018, Profitability Assessment of Petroleum Products, June 2019)

Standardization of Oil Price Schedules

Perhaps the most important element that needs to be considered is a comprehensive review of the fuel supply contracts, critically interrogating the price schedules of the various suppliers to come up with a standardized pricing schedule. This is on the basis that the Cost Insurance Freight (C.I.F) made up a large portion of the fuel price and a comprehensive scrutiny of the cost elements that it constituted of is essential to achieve fuel price optimization.

Government engages suppliers of finished petroleum products through an open bid tender process. Contracts are awarded to bidders offering lowest prices at which fuel can be delivered to government fuel depots. The definition of "lowest prices" is to a limited degree in that it only compared offers by bidders and had not had a hard-set benchmark against which the offers can be measured. Therefore, a quick review of the suppliers' price schedules indicated that there are variations in landed costs whilst the cost lines are similar for all the suppliers. The variances on each of the cost lines suggests that the definitions of what constitutes these cost lines may not be similar. The variation in the costs-lines between the suppliers illustrates the measure of central tendencies for petrol and diesel. The measures of central tendencies (unstandardized costs) are then used to conduct the variation analysis between standardised cost and unstandardized costs.

This has prompted the need to standardise the definition of the cost lines and the quantum of the costs. And setting hard benchmarks against which their value can be measured.

Epilogue

Through a comprehensive review of the several cost elements that make up the pump prices and aligning them with internationally acceptable standards as per best practice, we found that there would be approximately 24.2% and 27.6% reduction in the landed costs of petrol and diesel, respectively. For crude oil, standardization of the oil price margins resulted in an estimated saving of USD280.95/MT (15.59%). Further, the application of the proposed adjustments to the Cost-Plus Model, the pump prices of petrol and diesel decreased by an average of 8.91% and 9.94% respectively.

Supplementary Material and Reading

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