

**OCTOBER 2023** 

# **DIAGNOSTIC ASSESSMENT OF THE PETROLEUM SUB-SECTOR IN ZAMBIA**



Policy Monitoring and Research Centre

# ACRONYMS

BOZ	Bank of Zambia
ERB	Energy Regulation Board
GRZ	Government of the Republic of Zambia
IPP	Import Parity Price
KM	Kilometer
M3	Cubic Meter
MMD	Movement for Multiparty Democracy
MOE	Ministry of Energy
MoFNP	Ministry of Finance and National Planning
MT	Metric Tonnes
NEP 2019	National Energy Policy 2019
OMCs	Oil Marketing Companies
PF	Patriotic Front
PMRC	Policy Monitoring and Research Centre
RDA RTSA	Road Development Agency Road Transport and Safety Agency
TPPL	Tazama Petroleum Products Limited
UNIP	United National Independence Party
UPND	United Party for National Development
US\$	United States Dollar
ZCSA	Zambia Compulsory Standards Agency
ZMA	Zambia Metrology Agency
ZRA	Zambia Revenue Authority
ZWM	Zambia Weights and Measures

# TABLE OF CONTENTS

Acknowledgements	iii
Executive Summary	iv
. Introduction	1
1.1 Approach	2
1.2 Report Structure	3
2. The Petroleum Sector in Zambia	3
2.1 Brief History of Zambia's Petroleum Sector	3
2.2 Institutional Structure	5
2.3 Petroleum Policy and Regulatory Framework	6
3. Research Findings	7
3.1 Findings on the Upstream Segment	7
3.2 Findings in the Downstream Segment	10
+. Conclusions and Recommendations	13
References	15

# ACKNOWLEDGEMENTS

The completion of this research would not have been possible without the contributions and support of many organizations and individuals. We would like to thank the Ministry of Energy for their invaluable input and support throughout the research process. In addition, we would like to extend our sincere thanks to the Energy Regulations Board (ERB), TAZAMA, INDENI, the Oil Marketing Companies (OMCs), Fuel transporters and all who participated in the study for generously sharing their time, experiences, and insights. Their willingness to participate in the study was essential to the success of this project.

# **EXECUTIVE SUMMARY**

This diagnostic study of the petroleum sub-sector was undertaken to understand the status, key challenges, and potential reforms necessary to ensure the sustainability and reliability of the petroleum sub-sector in Zambia. Zambia's national petroleum demand had until March 2023 traditionally been met by two modes of supply: i) direct importation of finished petroleum products and ii) by importation of crude oil via the TAZAMA pipeline for refinement into various products at INDENI refinery.

However, following prolonged operational difficulties at TAZAMA pipeline and INDENI refinery, largely due to high maintenance costs associated with running aging infrastructure, the new dawn Government led by the United Party for National Development (UPND) shutdown and placed TAZAMA and INDENI on care and maintenance in 2021 as part of its wide-ranging petroleum sector reforms. Other key reforms announced included repurposing of the TAZAMA pipeline from carrying crude oil to the transportation of low-sulphur diesel and the conversion of INDENI from refinery to operating as an Oil Marketing Company (OMC).

By any measure, the conversion of TAZAMA has been quite quick, with the first finished products received at the INDENI terminal on 20<sup>th</sup> March 2023. While the developments in the petroleum subsector in the last year or so have been lauded as good steps towards achieving the goal of adequate, reliable and affordable supply of petroleum products in line with the objectives of the 2019 National Energy Policy (NEP 2019), the petroleum sub-sector still faces significant challenges.

Our study found that pipeline security is a key issue of concern among all stakeholders, given the strong link between security of infrastructure and the security of supply of petroleum products for any nation. Poor road infrastructure and inadequate border infrastructure were also highlighted as some of the key challenges faced by stakeholders such as the fuel transporters and OMCs. Collectively, inefficient borders and poor roads significantly raise OMC and transporter operation costs arising from frequent breakdowns, congestion, and prolonged cargo loss through evaporation. Other challenges raised include onerous and duplicative licencing requirements for filling stations and petroleum tanker trucks in Zambia; inadequate storage capacity and facilities in the country; and illegal fuel supply and unfair competition from foreign fuel transporters. Last but not the least, nearly all the OMCs interviewed indicated that they suffered significant financial and exchange losses due to the use of lagged and non-cost reflective parameters in the Energy Regulation Board (ERB)'s current petroleum pricing model.

In order to promote a sustainable, resilient and affordable petroleum sub-sector, the Government needs to implement the following reform measures:

- i) **Develop a robust inter-model transport system:** The Government must promote an intermodel transport system to ensure efficiency of the petroleum supply chain. Such a system would seamlessly integrate all relevant systems such as pipeline, railway, and road.
- ii) Streamline border processing and invest in bulk storage facilities: In order to improve efficiency and reliability of petroleum supply into the Zambian market, customs and border clearance procedures must be streamlined and more fuel storage depots and facilities constructed.
- iii) Leverage the transition for local economic empowerment and job creation: The full implementation of the Statutory Instrument (SI) no. 35 requiring at least 50% of petroleum products be transported by local transporters would be a good opportunity for Government to actualise the increased participation of Zambians in the petroleum value chain.
- iv) **Streamline petroleum licensing requirements:** Government through the ERB must facilitate a streamlined and well-coordinated system for the inspection, registration and licensing of petroleum tanker trucks and filling stations in Zambia.
- v) **Tackle a rising new wave of sophisticated smuggling of petroleum:** There is an urgent need to investigate and arrest a new form of in-transit fuel smuggling involving registered trucks.
- vi) **Urgently revise the petroleum products pricing model:** The ERB should consider revising the petroleum pricing model to ensure the use of more recent or forecasted rather than historical exchange rates and international oil prices to minimise Oil Marketing Company (OMC). foreign exchange and financial losses resulting from adverse movements in currency and international oil prices.



Tazama Oil Depot

### INTRODUCTION

Zambia's national petroleum demand had traditionally been met by importations of crude oil and finished petroleum products. **Imported commingled crude oil was transported via the 1,710 km TAZAMA pipeline to INDENI refinery for processing into finished petroleum products such as diesel, petrol, kerosene and Jet-A1**. Finished petroleum products had and have also been directly imported into the country by private Oil Marketing Companies (OMCs) to complement the production of petroleum products at INDENI. In addition to finished petroleum products INDENI was a source of heavy fuels for electricity production by Ndola Energy.

However, both the TAZAMA pipeline and INDENI refinery have faced increasing operational difficulties largely due to high maintenance and operational costs associated with running the aging pipeline and refinery infrastructure. Over the years, the corrosion and leakages of the pipeline due to poor maintenance have reduced the operational efficiency and carrying capacity of TAZAMA. And high refinery maintenance and operation costs coupled with frequent accidents and irregular crude oil supplies, have led to frequent and costly shutdowns at INDENI. In 2017 for example, INDENI was shut down for a total of 65 days due to maintenance and a lack of feedstock, but the intensity of shutdowns increased to 191 days in 2020 and to the record 338 days in 2021 largely due to a lack of feedstock (ERB, 2021; 2017).

Following the long closure of INDENI and TAZAMA that started in 2020, the new dawn Government led by the United Party for National Development (UPND) shutdown and placed TAZAMA and INDENI on care and maintenance in 2021. The move was undertaken as a measure to facilitate the repurposing of the TAZAMA and INDENI pipeline for the transportation and bulk storage of finished petroleum products. Initially, the plan focuses on transporting low-sulphur diesel through the repurposed 1,710 km TAZAMA pipeline from Dar-es-Salaam in Tanzania to Ndola. Once received at INDENI in Ndola, the low-sulphur diesel would be stored at the INDENI and Ndola Fuel Terminal storage facilities and other satellite storage depots for onward distribution to OMCS, and commercial and retail customers throughout the country. The transformation of the pipeline has happened quite rapidly, with the conversion of the pipeline completed in March and the first finished product received at INDENI on 20<sup>th</sup> March 2023.

While the developments in the petroleum sector in the last year or so have been lauded as positive steps towards achieving sustainable, cost effectiveness and price efficiency in the petroleum supply as envisioned in the 2019 National Energy Policy (NEP 2019) (Ministry of Energy, 2019), the petroleum sector still faces significant challenges. Not least among these challenges are inadequacies in the petroleum sector institutional framework, inefficiencies in the procurement of petroleum products, inadequacies in the petroleum price regulation models, **inequalities in fuel distribution and consumption, and the existence of illegal and sub-standard products n the Zambian petroleum market.** 

In the context of the ongoing petroleum sector reforms, the Policy Monitoring and Research Centre (PMRC) with the support of the Ministry of Energy, commissioned a rapid diagnostic assessment study of the petroleum sector in Zambia to understand the current challenges and reform options.

The main objectives of the study were:

- a) To understand the current key challenges in the petroleum sector.
- b) To identify potential opportunities of support for petroleum sector reforms.
- c) To recommend plausible pathways for petroleum sector reforms.

#### 1.1 Approach

Over the period of October to December 2022, the study team interviewed about 39 experts from 15 key stakeholders involved in the petroleum sector to identify the potential challenges and priorities for reform in the sector. The study used a semi-structured diagnostic assessment tool and conducted document reviews to answer the research objectives. The key stakeholders interviewed included the Ministry of Energy as the key policy maker, the ERB as the petroleum sector regulator, RTSA as a key stakeholder in licensing and safety enforcement in the sector. TAZAMA and INDENI were also interviewed given their historical role in the transportation and processing of crude oil as well as their current roles in the ongoing sub-sector transitions. The other key stakeholder interviewed included included leading and upcoming OMCs and Petroleum transporters given their increasingly important role in procuring, transporting and distributing of imported finished petroleum products on the Zambian market.

The technical assessment had questions that covered the entire value chain; from the policy and regulatory environment to procurement of finished products, cross-border clearance and transportation of the products, adequacy of bulk storage facilities, to issues around distribution and sales. While the study clearly identified the key stakeholders for each stage of the petroleum cycle, all stakeholders were asked to comment on all questions. This was beneficial in two ways: first, the study fully benefited from the cross-sector petroleum experience that most of the interviewees had<sup>1</sup>; and second, this allowed corroboration and triangulation of our findings.

<sup>1.</sup> Most interviewees had vast and many years of experience across the petroleum value chain with some having worked in OMCs and later working as transporters while other had started their careers further upstream at INDENI/TAZAMA or in large multinational OMCS before opening their own OMC or fuel transportation operations.

Although not necessarily a political economy study, the study team paid attention to any relevant political economy considerations that the Government would need to take into account to ensure successful petroleum reforms. And finally, a careful review of the relevant policy documents and other empirical literature in the petroleum sub-sector in Zambia was undertaken to ensure all the issues in the report were current and relevant.

#### **1.2 Report Structure**

This report is structured as follows. Section 2 provides an overview of Zambia's petroleum subsector, including its history, institutional and regulatory structure, and existing policies related to the development of the sector. Section 3 then presents the main findings and challenges identified from the key stakeholder interviews. Section 4 concludes with a presentation of the recommendations for the next steps.



## 2. THE PETROLEUM SECTOR IN ZAMBIA

BSL Infrastructure | Petroleum Depots In Zambia

#### 2.1 Brief history of Zambia's petroleum sector

Various political and economic factors have shaped the development of the petroleum sub- sector in Zambia. At independence in 1964, Zambia's petroleum needs were met by importing finished products from Southern Rhodesia (now Zimbabwe). More than 90% of Zambia's petroleum supplies routed through Zimbabwe with 52% of the imports directly sourced from the Umtali Refinery in Zimbabwe (Griffiths, 1969). The early petroleum sub- sector developed to primarily support Zambia's mining and industrial activities on the Copperbelt and Kabwe and to fuel the rapid urbanization of various towns such as Livingstone and Lusaka. However, following Zimbabwe's unilateral declaration of independence from British Colonial rule in November 1965, wide ranging economic sanctions and including an oil embargo were imposed on Zimbabwe by Britain (Temu and Tembe, 2014). In retaliation, Zimbabwe imposed its own sanctions against Northern Rhodesia (Zambia) including a complete ban on the transportation of petroleum products via Zimbabwe. Faced with a total economic collapse given that more than 90% of the country's fuel supplies were transported via the southern route, the Zambian Government's first response was to ration petroleum consumption while embarking on expensive emergency fuel supply measures such as airlifting petroleum products from Kenya and Tanzania using British, Canadian, and American military aircraft. By around 1966, the Zambian Government had imported oil tanker trucks (from Fiat, Italy) and started transporting finished petroleum from Tanzania by road (Griffiths, 1969). However, the road transportation of petroleum products from Tanzania proved extremely costly, due to the very bad condition of the Great North Road which was mostly gravel at the time. The frequent break downs, and incidences of fires and accidents involving oil tanker trucks led to erratic supply of petroleum products in Zambia.

To improve the fuel supply situation, the Government considered building a tarred highway or constructing a pipeline between Tanzania and Zambia. The latter was adopted given the shorter construction time and cost competitiveness. With funding from the Italian banks, construction of the 8-inch diameter 1,710 km TAZAMA pipeline commenced in January 1967. Despite numerous construction problems such as navigating the hostile terrain with many rivers and high mountains in southern Tanzania, the main contractor, Snam-Progetti (a subsidiary of Italian national petroleum company, ENI), swiftly completed the pipeline within 22 months. Remarkably, the first petroleum products to flow through the pipeline reached the Bwana Mukubwa Terminal in Ndola on 24<sup>th</sup> August 1968. Shortly after, the longest pipeline on the African continent, was officially opened on 2<sup>nd</sup> September 1968, three weeks earlier than scheduled (Griffiths, 1969).

While the immediate aim for the pipeline was to mitigate the fuel crisis and normalise the supply of finished petroleum products to the mining and industrial sectors, Government's longer term goal was to use the pipeline for the supply of crude oil to a refinery (to be constructed in 1971) next to the TAZAMA Bwana Mukubwa terminal. The main objective of having the refinery was to guarantee a diversified supply of finished petroleum products and guarantee that the mining and industrial sector needs for Heavy Fuel Oils (HFO) and diesel were met as needed. In many ways, the refinery would guarantee the security of supply and product diversity for Zambia.

The construction of INDENI refinery was completed in 1973, with ownership equally held by the Zambian Government through the INDECO group of companies, and the Italian Government through ENI (Italian Government petroleum parastatal). With the completion of INDENI, the TAZAMA pipeline was converted for the transportation of commingled crude oil for processing at the new refinery. The installed annual processing capacity of INDENI at the time was 1.1 million metric tonnes per year and at the time this capacity was more than sufficient to cater to the petroleum needs of the country.

Since the 1970s, TAZAMA and INDENI have however faced various challenges. Various episodes of slow economic growth, budget deficits and debt crises since the oil crisis of the mid-1970s to the recent COVID-19 induced economic slump had a direct negative impact on the Government's ability to fund the regular supply of crude oil and operations at TAZAMA and INDENI. Fiscal challenges also meant failure by the Government to properly maintain the petroleum infrastructure at TAZAMA and INDENI, resulting in corrosion and leakages in the pipeline; and abrasions, fire incidences, and frequent shutdowns at INDENI. These factors led to a decline in the operational efficiency of TAZAMA and INDENI over the years. For example, while TAZAMA was designed to handle a throughput of 1.1 million metric tonnes (MT), actual throughput capacity has progressively declined, reaching about 600,000 MT in 2010 before rapidly deteriorating to 350,000 MT in 2020 and reaching a record low of 42,000 MT in 2021 (Energy Regulation Board, 2015; 2022). Correspondingly, the amount of petroleum processed at INDENI refinery has progressively declined over the years, reaching about 625,000 MT in 2010 and rapidly deteriorating to 372,000 MT and a record low of only 56,000 MT in 2020 and 2021, respectively (Energy Regulation Board, 2015; 2022).

Following the latest episode of operational problems at INDENI that started in early 2020 until late 2021, the UPND Government announced an indefinite shut down and put TAZAMA and INDENI on care and maintenance. The Government further announced plans to repurpose TAZAMA and INDENI away from transporting and processing crude oil, to the transportation, storage and distribution of finished products, particularly low-sulphur gasoil (low-sulphur diesel).

#### 2.2 Institutional structure

The institutional structure of Zambia's **petroleum sub-sector can be broadly classified into the upstream and downstream segments, whose operations are guided and regulated by the central Government.** The Ministry of Energy (MoE) is responsible for achieving the objective of ensuring adequate, reliable and affordable supply of petroleum products in order to increase security of supply of petroleum products as set out in the National Energy Policy of 2019 (Republic of Zambia, 2019). The MoE is thus responsible for the overall policy formulation, coordination and guidance for the petroleum sub-sector. The Ministry is also responsible for monitoring and managing strategic reserves; and the facilitation of petroleum imports to ensure adequate supply to meet market demand (Energy Regulation Board, 2022). The Energy Regulation Board (ERB) on the other hand develops regulation procedures, systems and standards to facilitate the regulation of the petroleum sub-sector. The ERB ensures compliance by market participants such as OMCs and transporters to operational requirements, facilitates fuel marking and product quality monitoring, and projects national demand of petroleum products to support energy needs planning by the MoE and OMCs.

Before the November 2021 petroleum sub-sector reforms, the upstream segment of the petroleum sector comprised Government-controlled entities such as TAZAMA, INDENI and the Tazama Petroleum Products Limited (TPPL) which were primarily responsible for the transportation of crude oil from Tanzania, and for the refinery, storage and distribution of refined products to regional storage depots. The Downstream segment then comprised finished petroleum product dealers and OMCs primarily involved with the distribution and sale of the finished products to the end users. It is evident that the upstream segment was highly dominated by Government monopolies, while the downstream was dominated by private players (Nyamazana, 2023, forthcoming).

Following the November 2021 reforms, the Government's historical dominance and monopoly in the supply of petroleum products on the market was effectively removed. The Government is no longer involved in the purchase and refinery of petroleum crude oil, nor involved in the awarding of oil supply contracts for finished products. Instead, the private sector led by the OMCs directly source and supply finished products to meet the country's petroleum product demand. The OMCs' role in the petroleum sub-sector value chain has therefore been elevated and are likely to continue to play a significant role even when the repurposing of TAZAMA for finished product transportation is complete. In the short to medium term, the OMCs will continue to actively import all finished petroleum products such as unleaded Petrol, Kerosene, HFO, Jet-A1, Bitumen, and around 20% of the low-sulphur gasoil because TAZAMA can only transport 80% of low-sulphur gasoil. The upstream market has thus become more competitive with increased private sector participation. The role of TPPL, which is to operate and manage the country's petroleum storage facilities that distributes petroleum products to downstream players will continue under the new reforms, especially with the commencement of gasoil transportation via TAZAMA. The use of INDENI's oil refinery plant remains in limbo, but INDENI itself is set to become an OMC to increase competition in the downstream segment, and thus enhance security of supply and promote supply of petroleum products in rural areas.

#### 2.3 Petroleum policy and regulatory framework

The petroleum sub-sector policy framework is anchored on National Development Plans with the current being the Eighth National Development Plan (8NDP) and the National Energy Policy of 2019 (NEP 2019), whereas its regulatory framework is supported by the Petroleum (Exploration and Production) Act of 2008, the Energy Regulation Board Act of 2019, the NEP 2019 and various strategic plans. The 8NDP is the current penultimate plan and overarching policy document for achieving Vision 2030 – where all Zambians live in a prosperous middle-income nation by 2030. The 8NDP recognises energy as a key enabler of Zambia's economic transformation, and thus, considers energy sector reforms as crucial towards achieving the industrialised and diversified economy status by 2030. In particular, the 8NDP lists the removal of inefficiencies in the fuel supply chain, such as, standardizing fuel supply prices and supplying of diesel through the pipelines as some of the reforms needed to improve the efficiency of the energy sector (MoFNP, 2022).

The NEP 2019 is the most comprehensive and current energy sector policy document whose overall objective is to achieve optimal energy resource utilisation to meet Zambia's growing domestic and non-domestic energy needs at the lowest economic, financial, social, and environmental cost. The NEP 2019 aims to ensure adequate, reliable and affordable supply of petroleum products and natural gas in order to increase the security of supply of petroleum products. The main policy reforms identified to achieve the petroleum sub-sector objectives include; enhancing the cost-effectiveness and efficiency in the supply of petroleum products; ensuring effective and efficient pricing of petroleum products; ensuring full capacity utilization of existing petroleum infrastructure; promoting investments in the petroleum infrastructure especially in rural areas; and strengthening mechanisms aimed at ensuring uniform pricing of petroleum products across the country (Ministry of Energy, 2020).

The successful realisation of the objectives of the 8NDP and NEP 2019 requires a strong legal and regulatory framework that considers the current dynamics in the energy sector. The current legal framework, anchored on the Petroleum Act and the Petroleum (Exploration and Production) Act needs updating. The Petroleum Act, which governs the operations of the downstream segment of the petroleum sub- sector was enacted in 1930 and last amended in 1995 and misses important features of the petroleum sub-sector . The Petroleum Act for example continues to ascribe the function of authorisation for storage of more than 200 litres of petroleum to the local councils, when such responsibility should lie with the Energy Regulation Board as provided for under the Energy Regulation Act, No. 12 of 2019 (National Assembly, 2020). Numerous other weaknesses in the Petroleum Act are observed, including that the Act does not specify the minimum standards acceptable for a given type of petroleum product. The ERB therefore uses another law, the Standards Act, No. 4 of 2017 to guide on the standards for petrol, diesel and other petroleum products and the regulation of filling stations (CUTS International 2020; National Assembly, 2020)<sup>2</sup>.

The Petroleum (Exploration and Development) Act, No. 10 of 2008, which governs the upstream segment of the petroleum sub-sector also has significant gaps. For example, the law does not provide for a mechanism for local economic empowerment nor prescribe a taxation regime in the case of discovery of petroleum in the country. Numerous other gaps highlighted in other reviews (such as National Assembly of Zambia (2020) and CUTS International (2020)) highlight a need to urgently update the laws that govern the petroleum sub-sector in Zambia. Updating the laws will provide the much-needed legal basis to operationalise the various implementation plans and strategies that the Government through the Ministry of Energy have developed such as the NEP 2019 and the Energy Efficiency Strategy and Action Plan (Republic of Zambia, 2022).

<sup>2.</sup> More information on the outdated aspects of the legal framework are available in CUTS International (2020) and National Assembly of Zambia (2020).



**INDENI** Petroleum Refinery

# **3 RESEARCH FINDINGS**

In line with the aims of this diagnostic assessment, this section presents the main findings on the current status, constraints and opportunities in the petroleum sub -sector.

To begin with, the findings suggest that **there is a strong Government commitment to petroleum sub-sector reforms.** Despite having been in power for about a year by the time of the interviews, the UPND Government has demonstrated a strong commitment to implementing the petroleum sub-sector reforms announced in November 2021. By November 2022, our interviews with key governmental stakeholders highlighted various tangible changes on the ground. For instance, administrative changes to the articles of association governing the operations of INDENI had already been made, with ERB having already granted INDENI licences to import, export and distribute finished petroleum products, thus in effect transforming INDENI into an OMC. On the other hand, the conversion of TAZAMA Pipeline from a petroleum feedstock carrier to a carrier of finished products has been completed, with the first finished petroleum products received on 23<sup>rd</sup> March 2023. At present, the Government is reviewing and updating the legal and regulatory framework to reflect the recent changes in the petroleum sub-sector.

The political will and reform steps being undertaken to transform the petroleum sub-sector are certainly commendable. The reform process would however need to be comprehensive and consider the various inputs from a cross-section of petroleum sub- sector actors presented below.

#### 3.1 Findings on the Upstream segment

The current transition in the upstream segment of the petroleum sub-sector presents some opportunities for the sector and economy at large. The transmission from using the road to transporting finished low sulphur diesel via the TAZAMA pipeline presents numerous opportunities. First, the pipeline mode of transportation will yield significant cost savings. Our interviews established that among the three potential modes of petroleum transportation available to Zambia, road transportation is the most expensive, followed by rail and then the pipeline. The transportation

cost by road is estimated at around US\$ 125-150 per cubic meter of petroleum product, but this reduces by more than half (i.e. US\$ 60-70) if transported by railway line and drops further to US\$ 30-40 if transported via the pipeline. Given that transportation costs are a key component in pricing petroleum products in Zambia, the switch to pipeline transportation costs would therefore lower the retail price of low sulphur diesel in the country.

Second, the switch to pipeline transportation will help improve efficiency in the delivery of petroleum products leading to more consistent and sustainable supply of petroleum on the market. In addition, the use of the pipeline would significant reduce traffic and congestion on the roads, leading to lower road accidents and fatalities and lower road maintenance costs.

However, numerous challenges that we discovered during field work that need to be addressed as the petroleum sector is transitioning. These challenges and issues are discussed below.

a) **Pipeline security;** First, there are concerns about the physical security of the pipeline infrastructure, particularly given that the pipeline covers a long distance of 1,710 kilometres across two countries and over difficult river basins and mountainous terrain including the two arms of the East African rift valley. Even though the pipeline infrastructure is necessarily temper proof by design, interviewees expressed concern about the increased risk of vandalism by thieves in an attempt to steal the diesel.

It was therefore felt that the transition must comprehensively address any actual or perceived security risks, ranging from the increased physical patrols to use of drones as is done in Kenya. One OMC interviewees suggest that there is also need to change the law to make any tempering with the pipeline a criminal offence with heavy sentences like is the case in Tanzania. Currently, tempering with the pipeline is treated as a mere case of vandalism and is not as severely punished as in Tanzania. Other measures could include the involvement of community policing and intelligence and keeping sensitive information secure to deter leakage to criminals. The key interviewees however felt confident that with the security preparations that Zambia and Tanzania have put in place including regularly ongoing bilateral meetings, the TAZAMA pipeline will be as secure as any other finished products pipeline on the continent.

b) Security of supply risks; Another concern raised by nearly all the petroleum sub-sector stakeholders was that there was a risk to the security of supply of petroleum products since the Government left the supply of petroleum products to the private sector, primarily the OMCs. Currently, the supply of petroleum products into the market is driven by profit motive, and not the need to ensure security of supply. And this can be seen by how quickly OMCs stop importing and supplying a particular petroleum product whenever the projected margins reduce.

"OMCs interest is only profit, while Government's interest is stable petroleum supply" Public sector Interviewee.

During the period November 2021 and February 2022, there were several reports of shortages of petrol in some filling stations in Lusaka, largely due to OMCs reducing their importation of petrol on account of low profit margins. In rural areas, the supply situation is quite erratic due to low sales volumes and profit margins. The issue therefore is that currently, Zambia has limited ability to ensure full security of supply of petroleum products. Furthermore, the current legal and regulatory framework does not have strong provisions to secure security of supply of petroleum products in

Zambia. In the event of adverse movement in the market fundamentals, Zambia has a very high risk of petroleum supply disruption without adequate migratory measures.

c) **Inadequate upstream support infrastructure and logistics:** A recurring complaint among the OMCs who actively import and transport finished products from ports such as Beira in Mozambique, Dar-es-Salaam in Tanzania and Walvis Bay in Namibia is that Zambia's petroleum support infrastructure and logistics is generally poor, resulting in operational losses and costly delays for the OMCs. In particular, all the road routes from the ports into Zambia are in bad state. The route from Namibia to Zambia has been in very bad condition between Sesheke and Kazungula for many years, forcing the fuel transporters to cover an extra 700 kms going via Mongu to avoid the severely damaged parts of the road (see Figure 1). Similarly, the stretch between Nakonde and Serenje is in deplorable state.

Figure 1: State of the Sesheke-Kazungula road on the Namibia-Zambia route



Source: Zambia National Broadcasting Corporation (ZNBC, 8th January 2023)

The bad road network has led to numerous breakdowns, accidents, and delays in petroleum deliveries. A local fuel transporter interviewed revealed that while tanker truckers would normally take 6-7 hours to cover the 320 kilometre trip from Ndola to Lusaka in the past, the travel time is now around 12 hours due to the poor state and congestion of the Lusaka – Ndola road. As can be seen, Zambia's road infrastructure is generally poor and there is urgent need to repair and upgrade various routes in order to improve the efficiency of petroleum sub-sector supplies. This is more so given that the delivery of (non-diesel) products such as unleaded Petrol, Jet fuel and Kerosene will continue by road for the foreseeable future.

d) **Inefficient border clearance:** A related logistical challenge reported by OMCs involved in the importation and transportation of finished products in Zambia was that customs processes take too long, at various border posts. Various OMCs narrated how tanker trucks are often

marooned for days at border crossings, resulting in delayed deliveries, and risk of loss of business due to OMCs failure to deliver on contracts on time.

#### 3.2 Findings in the Downstream segment

The petroleum sub-sector transition has presented some opportunities in the downstream segment of the sector, in particular, the increased responsibility for the OMCs to meet the national demand for petroleum products has presented opportunities for growth for local OMCs and fuel transporters. During the interviews, a Zambian owned petroleum company boasted of more than doubling its fleet of petroleum tanker trucks largely due to increased business and positive prospects for the private sector. Market participation and competition had also increased owing to an increase in the number of filling stations in the country. The increased competition is good for the consumers, as filling stations are spreading out geographically in search of new markets and providing better quality services in competition for customers. The transition in the petroleum sub-sector also presents an opportunity for more young Zambians to participate in the largely foreign dominated sub-sector. The petroleum sub-sector youth empowerment programme that started under the previous Patriotic Front (PF) Government could be strengthened and expanded given the increased market that Government has created by opening the petroleum sub-sector private participation. And finally, the petroleum reforms are a welcome opportunity for the Government to do away with the costly fuel sector subsidies (which reportedly cost the taxpayer US\$67 million per month) under the old refinery model of fuel supply.

While the transition has brought about clear benefits, it's important that the various challenges in the downstream segment of the sector are addressed. Below are some of the findings from the interviews.

a) **Onerous licencing requirements:** A cross-section of OMCs and fuel transporters interviewed expressed concern about the many regulatory requirements needed to register a tanker truck or open a filling station in Zambia. All the interviewed fuel transporters, transporter associations and OMCs who transport fuel using their own trucks reported that Zambia's licensing requirements were too many, stringent and somewhat duplicative. In addition to the normal motor vehicle licensing requirements by RTSA such as road service licence, fitness certificate and insurance, prospective tanker operators need to pay for and conduct various other physical inspections and verifications of standards by agencies such as the Zambia Compulsory Standards Agency (ZCSA), Zambia Weights and Measures (ZWM), Energy Regulation Board (ERB) and the Zambia Revenue Authority (ZRA). Although the importance of the various road safety checks and inspections was well appreciated, the tanker operators were most concerned about the long time the inspections took, and about the fact that some of the tests were somewhat duplicated by different agencies. For example, the calibration checks at ZWM are similar to what the ZCSA perform. A key suggestion from the tanker truck operators was that some of these inspections could be streamlined and conducted by one agency to save on time and costs. Apparently, in neighbouring countries such as Zimbabwe, the inspections and certifications of tanker trucks takes a relatively shorter time compared to Zambia.

The process for opening and operating a filling station was reportedly cumbersome, taking several months and sometimes years before an OMCs could be allowed operations. Similar to concerns around licensing tanker trucks, the biggest concern among the OMCs was that licensing a filling station took too long and involved too many uncoordinated activities across various agencies. Some of the requirements needed are permits and titles from the local authorities and Ministry of Lands and Natural Resources, environment impact assessments from the Zambia Environmental Management Agency (ZEMA), and clearance from the Road Development Agency (RDA) before the ERB conducts its own assessments. One local OMC narrated that despite having the requisite documentation and capital, it has spent several years trying to build a filling station in a district in Luapula province.

Inadequate storage capacity, a lack of sufficient petroleum storage infrastructure is another key constraint to the operations of the petroleum sub-sector in Zambia. Various stakeholders pointed out that seven bulk storage facilities operated by the Government through the TAZAMA Pipelines Products Limited (TPPL) (located at Ndola Fuel Terminal) do not have adequate capacity to cater for the growing national demand for petroleum. Moreover, most satellite depots like the ones in Mansa, Mongu and Chipata have been inactive for some time now due to the TPPL's limited operations in the last 5 years or so. Moreover, the facilities that are operational are not operating at full capacity. Table 1 shows the bulk storage capacities for the whole country. Due to the low storage capacity and sub-optimal levels of operations, it was estimated that Zambia's petroleum storage stock at the time of the interview was only about 2-3 days of national consumption, when the ideal should be at least 15 days to cushion against various supply risk factors.

Depot	Capacity	<b>Operational Status</b>
Solwezi	15,000	Active
Ndola	110,000	Active
Mansa	6,500	Inactive
Mpika	6,500	Active
Mongu	6,500	Inactive
Lusaka	25,000	Active
Chipata	1,400	Inactive
New Lusaka	120,000	Under-construction

#### Table 1: Bulk storage capacities (as at December 2022)

Source: TPPL interviews (29th November 2022)

The availability of storage infrastructure among OMCs is even worse, with most OMCs, with the exception of few large ones, having no petroleum storage facilities at all. The lack of petroleum storage facilities has contributed to erratic fuel supplies especially in rural districts, where it's not uncommon for filling stations to run dry for several weeks.

"The lack of strategic petroleum facilities and policies implies that our petroleum sector operates on a hand-to-mouth basis" OMC Interviewee.

The

general lack of adequate petroleum storage infrastructure presents a significant risk to the smooth, sustainable and reliable supply of petroleum products in Zambia. To mitigate against this risk, various interviewees proposed the construction of additional storage facilities to meet the national petroleum demand which is projected to rise significantly in the next few years. This is particularly crucial, given the recent presidential ambitions to prop up copper production from the current 830,000 MT to 3 million MTs by 2030. Furthermore, updating the laws and regulations to require OMCs to keep a certain level of petroleum stock would help increase Zambia's petroleum storage facilities.

b) Lack of Government protection from unfair foreign competition: Various locally owned fuel transporters and OMCs interviewed highlighted a lack of Government protection for Zambian owned petroleum transporters from unfair competition from foreign OMCs and transporters. Since May 2021, the Zambian Government issued a directive that any entity importing petroleum products into Zambia must ensure that at least 50 percent of the product is transported by a local transporter in accordance with the provisions of Statutory Instrument (SI) No. 35 of 2021. This legal requirement was passed to ensure that Zambians can also benefit from the jobs and wealth in the petroleum transportation sector, which sector has historically been dominated by foreign owed businesses.

However, the lack of strong enforcement mechanisms has made it easy for most OMCs to ignore the S1 35 provisions altogether. Various interviewees indicated that the requirement for "local transporter" is in reality taken to mean a "Zambian registered" truck, but most of the Zambian registered tanker trucks are actually owned by foreign companies.

"If you look at Tanzania...there are no foreign petroleum trucks on their roads, all transportation is done by locals" Petroleum transporter Interviewee.

There is therefore a strong need for Government to strictly enforce the provisions of SI 35 to support the creation of the much-needed youth employment and wealth in Zambians.

- c) Complex fuel smuggling and illegal fuel vending: Various OMCs complained about the continued smuggling, adulteration, and illegal trade in petroleum products, especially in rural areas and around border towns. These illegal activities have continued to pose unfair competition in an environment which is already highly competitive with small profit margins. Although in general the ERB has managed to reduce illegal fuel smuggling and vending by working closely with the police and imposing stiff penalties on offenders, a local OMC reported a new trend in fuel smuggling activities, where trucks carrying unmarked petroleum earmarked for exports to markets such as the Congo DRC divert and dump their export cargo onto local markets through sophisticated fuel smuggling syndicates. The loss in unpaid taxes and fees caused by such practice was reported high, due to the large volumes involved. The ERB, ZRA and police must therefore intensify efforts to curb new and rising illegal fuel smuggling activities.
- d) Inefficient pricing of petroleum products: A recurring concern from the OMCs is that the current ERB model for pricing petroleum products is not efficient due to the use of historical exchange rate and international price parameters that significantly differ from current rates. All OMCs indicated that the use of the monthly average interbank commercial rate published by the Bank of Zambia (BOZ) has largely resulted in exchange rate losses for them especially that the Zambian economy has been under pressure and the Kwacha largely depreciating in the last 6 months of the interviews. In addition to reporting exchange losses, OMCs also reported difficulties accessing adequate forex supplies from the BOZ to import petroleum products. The forex shortages have often led to delays in importing petroleum products and business losses for the OMCs.

"ERB uses the BOZ average rate...however, OMCs do not buy from BOZ but from commercial banks." OMC Interviewee.

The other concern raised was that the ERB's use of historical international oil prices such as the Bulk Petroleum Supply (BPS) Premium (payable to the Bulk Supply Petroleum Agency in Tanzania) or the Platts prices payable to Suppliers in the Middle East were at least 30 days out of date.. To mitigate the above challenges, OMCs suggested using forecasted (rather than historical) US\$ exchange rates and using much more current international prices rather than several weeks old international oil prices.



ZAMBIA, TANZANIA GAS PIPELINE

## **4 CONCLUSIONS AND RECOMMENDATIONS**

This study undertook to understand the state of play of Zambia's petroleum sector transition and reforms. In a little over one year, the petroleum landscape has evolved rapidly, with the TAZAMA pipeline been fully converted from the carrying crude oil to the transportation of finished low-sulphur diesel and OMCs occupying an increasingly important role in Zambia's petroleum supply chain. The projected increase in petroleum national demand means that forward-looking reforms must be implemented to meet Zambia's future petroleum needs. To facilitate the petroleum sector transition, and promote a resilient, sustainable and affordable petroleum sector as envisioned in the 8NDP and NEP 2019, the Government will need to accelerate reforms in the petroleum sector including:

- 1) **Develop a robust inter-model transport system:** In addition to opening the finished products pipeline, the Government must promote an inter-model transport system for the petroleum sector for efficiency to be fully realised in the petroleum sector. Such a system would seamlessly integrate all relevant transport systems such as pipeline, railway, and road in order to facilitate the smooth and efficient transportation of petroleum products.
- 2) Facilitate efficient border processing for petroleum tanker trucks: To improve efficiency and ensure reliability of petroleum supply into the Zambian market, customs and border clearance procedures must be reformed to cut down the time it takes for petroleum tanker trucks to cross into Zambia and deliver petroleum products.
- 3) Leverage the transition for local economic empowerment and job creation: The ongoing reform present a unique opportunity for Government to legislate the increased participation of locals in the petroleum value chain. Full implementation of the S1 no. 35 requiring at least 50% local transportation of petroleum products would be a good start. Furthermore, Zambianowned OMCs could be given preference in Government's petroleum product purchases to support the sub-sector. In addition, investment opportunities in rural filling station areas could be prioritised for local OMCs. These measures would help support the growth of local OMCs and fuel transporters, thereby contributing to local job and wealth creation.

- 4) Invest in bulk and OMC-level storage facilities: Government must expedite the finalization and operationalization of Lusaka 120,000 capacity bulk storage and ensure OMC- level petroleum storage facilities for smooth supplies and availability of sufficient reserves to meet national demand. OMCs especially medium players who have inadequate storage must be encouraged to build storage facilities through specific and targeted incentives such as fiscal measures on building materials.
- 5) Streamline petroleum licensing requirements: Government through the ERB must facilitate an efficient and well-coordinated system for the inspection, registration and licensing of petroleum tanker trucks and filling stations in Zambia. Petroleum sector licencing is currently perceived as an onerous and slow process, streamlining the licencing processes without compromising the safety and quality standards would improve the petroleum sub-sector investment climate perception and encourage investments.
- 6) **Tackle a rising new wave of sophisticated smuggling of petroleum:** As established during the study, the Government will need to arrest illegal vending and smuggling of petroleum products. Increasing inspections and monitoring and imposing stiff fines and penalties to protect the petroleum market and the interests of the Zambian Government.
- 7) **Tackle the security concerns on TAZAMA pipeline:** The Government will need to put in place strong security measures including very strong legal deterrents to trespassing and attempts at vandalising pipeline infrastructure.
- 8) **Consider Revising the Petroleum Products Pricing Model:** The Government should consider revising the petroleum pricing model by using more recent or forecasted rather than historical exchange rates and international oil prices to minimise OMC foreign exchange and financial losses resulting from adverse movements in currency and international oil prices.
- 9) Ensure security of supply: Security of supply was one of the challenges identified by most stakeholders as most OMCs do not hold sufficient reserves. Therefore the study proposes two measures that will ensure security of supply countrywide: first, while Government has left the market to the market, there is need for it to keep its own stock through Indeni to ensure security of supply. Secondly, there is need for legislation to mandate OMCs to sale stock to each to ensure that there is no shortage of fuel In one part of the country while other parts have excess.

## REFERENCES

CUTS International. 2020. The Petroleum Sector in Zambia: Opportunities and Challenges. Available on: https://cuts-lusaka.org/pdf/policy-brief-the-petroleum-industry-in-zambia-challenges-and-opportunities%20.pdf (Accessed: 3rd January 2023)

Energy Regulation Board. 2016. Energy Sector Report 2015. Available on: https://www.erb.org.zm/ wp-content/uploads/files/esr2017.pdf (Accessed: 16th January 2023)

Energy Regulation Board. 2018. Energy Sector Report 2017. Available on: https://www.erb.org.zm/ wp-content/uploads/files/esr2017.pdf (Accessed: 19th January 2023)

Energy Regulation Board. 2022. Energy Sector Report 2021. Available on: https://www.erb.org.zm/ wp-content/uploads/files/esr2021.pdf (Accessed: 19th January 2023)

Griffiths, I.L., 1969. The TAZAMA oil pipeline. Geography, 54(2), pp.214-217.

National Assembly of Zambia. 2020. Report of the Committee on Energy, Water Development and Tourism for the Fourth Session of the Twelfth National Assembly. Available on: https://www.parliament.gov.zm/sites/default/files/documents/committee\_reports/Main%20Report%20on%20 Energy%20-%20Final%202020\_0.pdf (Accessed: 17th February 2023)

National Assembly of Zambia. 2022. 2023 National Budget Speech. Available on: https://www.parliament.gov.zm/sites/default/files/documents/articles/2023%20Budget%20 Speech.pdf (Accessed: 9th December 2023)

Nyamazana M. 2023. The Petroleum Sector. In, The Oxford Handbook of the Zambian Economy. Oxford, UK: Oxford University Press (forthcoming)

Republic of Zambia. 2019. The National Energy Policy 2019. Available on: https://www.moe.gov.zm/ wp-content/uploads/2022/04/The-National-Energy-Policy-2019.pdf (Accessed: 30th December 2022)

Republic of Zambia. 2022. Energy Efficiency Strategy and Action Plan. Available on: https://www. moe.gov.zm/wp-content/uploads/2022/08/Zambia-Energy-Efficiency-Strategy-and-Action-Plan-2022.pdf (Accessed: 30th December 2022)

Temu, A.J. and Tembe, J.D.N., 2014. Southern African liberation struggles: contemporaneous documents, 1960-1994.



Corner of Nationalist & John Mbita Roads, opposite Ridgeway Campus gate 10101 Lusaka, Zambia Tel: +260 211 269 717 | +260 979 015 660 www.pmrczambia.com