Regulation of Petroleum Product Pricing in Africa

A Proposed System Based on Studies of Four Sub-Saharan Countries

Patrick A. Wright
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Cover: Product terminal at Choma, Zambia. On the rail line between Livingstone and Lusaka, near Lake Kariba, the terminal is the main site for rail unloading and truck loading of petroleum products for this region of Zambia and for part of Zimbabwe. Photo courtesy of Mr. T. S. Nayar.
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Preface

This paper was prepared as background for a speech given by the author at the Downstream Petroleum Conference on Rationalizing Petroleum Products Supply and Distribution in the SADC Region in Maputo, Mozambique, August 1–3, 1994, sponsored by the Technical and Administrative Unit of the Southern African Development Community (SADC). The paper gives an overview of the need for and implementation of petroleum product pricing controls in Africa. It begins with a general discussion and then, based on data from four countries, proposes a general model for petroleum product pricing. The paper is based on a report for the World Bank by Mr. Ian Partridge, consultant. The author also gratefully acknowledges the input of Messrs. Eric Daffern and William Porter, Group Leaders, Oil and Gas Division at the World Bank.

The work was funded jointly by the Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP) and the World Bank.
Abbreviations and Acronyms

b.o.l. bill of lading
BP British Petroleum
CIF cost, insurance, and freight
DPK dual purpose kerosene
FOB free on board
IBLC in-bond landed cost
IDO industrial diesel oil
LPG liquefied petroleum gas
Petromoc Empresa Nacional de Petroleos de Moçambique (Petroleum Company of Mozambique)
NP National Petroleum Company (Sierra Leone)
PMS premium motor spirit
RPP refined product price
SADC Southern African Development Community
TEF Transport Equalization Fund (Tanzania)
TIPER Tanzanian Italian Petroleum Refinery
TPDC Tanzania Petroleum Distribution Company
ZNOC Zambia National Oil Company

Currencies and Units of Measure

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Introduction

Petroleum product markets in Africa are distinctive. They usually exhibit a high degree of market share concentration. The market participants—other than state-owned oil companies—are usually subsidiaries of European and American multinationals. Across the continent, the market share held by African-owned private sector companies is small.

A variety of pricing systems are in effect in Africa because of this concentration. However, the long-term objective should be price liberalization to achieve the benefits of efficiency and price competitiveness brought by a free market system. Depending on a country's circumstances, regulation may be needed for an interim period to achieve this long-term goal.

The typical price regulatory system used in Africa is cost-plus, in which maximum product prices are calculated from oil or product import costs, operating costs, and allowable industry margins. Worldwide, however, many other systems are in place. The Spanish and South African systems are discussed briefly in chapter 5. The United States and Western Europe, with their liberalized markets, are noted as models. Still, the cost-plus system has remained prevalent in Africa because of the small throughput volumes.

The need for and design of regulatory systems is based on an analysis of the industry. The industry consists of many key segments or activities: importation, storage, refining, transport, distribution, and sales. Policymakers must first examine the industry structure by segment (activity) in light of the business fundamentals and determine whether the industry has effective competition and is reasonably efficient. Then, they can consider an industry structure in the medium term as a step toward price liberalization. During this medium-term interim period, some degree of regulation will likely be required. The degree of regulation depends on the level of competition in any of the segments. Effective regulation lowers barriers to entry for potential competitors and allows time for the market as a whole to grow.

Once a decision is taken to control prices, the need of industry restructuring must take into account the current situation in the country. If restructuring the industry is also necessary, different interim courses may be taken:
• Investment may need to be limited because of excess capacity in a segment (e.g., import facilities).

• A segment of the industry may need to be eliminated (e.g., refining).

• Opportunities may arise to utilize capacity (e.g., transit).

This paper presents a general industry structure model and discusses the conditions that require price controls. It then examines the African petroleum product industry, as price controls are frequently needed there because of the limited competition. Specific issues regarding the implementation of a price control system are discussed based on a review of pricing systems in four countries: Mozambique, Sierra Leone, Tanzania, and Zambia (details on the specific countries are presented in Annexes 1 through 4, respectively). Finally, a generalized model is proposed and discussed against alternatives.
Industry Structure and Potential Need for Regulation

The first step in determining how petroleum product prices are established and whether or not regulation is required should be an examination of the industry structure and the structural characteristics that give rise to regulatory requirements. Industry structure includes, among other things, the number of participants ("players"), degree of integration, capacity utilization, and economic performance. This chapter introduces a general industry structure and links it with the need for and design of a product pricing system.

The Business Environment

Before examining this generic industry structural model, it is useful to consider the business environment. After all, it is the business environment that dictates how players compete and that shapes the ultimate structure of the industry. Any regulation and restructuring effort must recognize and address these fundamentals if liberalization is to be achieved in the end.

The petroleum products business is capital intensive and involves commodity products. Overall, this combination of factors leads to high business risks for investors—including the government—as they can have significant financial exposure. These business risks are driven by two sets of factors, one affecting the business in general, regardless of location, and the other related to the specific country:

- **International market factors.** Oil, capital, and currency markets are all volatile. Slight movements in any of them can affect economic performance severely.
- **Country factors.** A country's macroeconomic performance affects demand and availability of foreign exchange. National policies similarly affect the ability of companies to do business in a country.

These risks lead to very specific competitive requirements for the participants. First, the capital intensity increases the importance of economies of scale and scope. Put another way, larger scale operations enable costs to be recovered from a larger volume (economies
of scale), as does vertical integration (economies of scope). Note, however, that although the presence of integrated players may allow the industry to function more efficiently, it may also lead to abuses of market power. The high capital costs represent a significant barrier to entry, leaving open the possibility of players with large market shares and unfair pricing power. High expatriate management costs also make high throughput essential and are a barrier for new foreign entrants. Finally, as in any commodity business, operating costs are an important determinant of economic performance.

Industry Structure

Figure 2.1 presents the structure of the petroleum product industry. Note that two scenarios are involved: one in which crude oil is imported and refined in-country, and the other in which only products are imported. In both cases, the imported material progresses through a series of value-added steps on its way to the ultimate consumers. These common activities are noted along the top line of the diagram.

![Figure 2.1 Structure of the Petroleum Product Industry](image)

- The into-refinery price of domestic crude oil production should be treated as the equivalent of the import price.

The industry structure should also be examined by segment, as some players may not be integrated, and some areas may have more or less competition than others. Alternatively, certain segments may have a single entity by necessity. Thus, examination of both vertical and horizontal integration is critical.

The price build-up is characterized by a corresponding series of transfer prices including relevant costs and profits. The prices can be defined as follows:

- **Base price.** This is the purchase price of products or crude, CIF the main entry port. The base price, stated in U.S. dollars, may be an actual price paid or a deemed price based on international published prices. For the price regulatory system to work, it is necessary to have a split of costs between FOB and other shipping costs to yield the CIF price.

- **In-bond landed cost (IBLC).** This is the base price plus port charges and the importer’s margin, usually expressed in local currency. The importer’s margin covers costs such
as harbor dues, financing, storage, and so on. The IBLC is the appropriate transfer price from the importer to the distributor in the case of products, or to the refiner for crude.

- **Refined product price (RPP).** This is the IBLC plus the refiner's margin expressed in local currency. In some countries the refined product is transferred to national storage, the cost of which would be included here. This is the appropriate transfer price to distributors from the refiner/storage.

- **Maximum wholesale price.** This is the price from distributors to retail outlets or bulk purchasers. The distributor margin is the difference between the wholesale price and the IBLC paid for imported product or RPP paid to an in-country refiner for product.

- **Maximum pump price.** The pump price will include taxes, special levies, sales tax, and so on. So the definition of retail margin needs to change. A better split is (a) refiner (or product import parity), (b) marketer (distributor), (c) dealer for retail, and (d) government taxes and levies. This is the price charged by retail outlets to their end-users. The retail margin is the difference between the maximum pump price and the maximum wholesale price plus any taxes.

Figure 2.2 illustrates these definitions in the context of industry structure for the case of an in-country refinery. Note that the price at any stage includes cost recovery and a profit (margin) for the participants. In general terms, costs include all cash and noncash operating and administrative costs. These costs and the profit are the focus of the need for and design of regulatory systems. In short, the industry must keep operating and capital costs at efficient levels, and no player should be in a position to reap an excessive profit.

**Figure 2.2 Petroleum Product Price Build-up**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Import</th>
<th>Storage</th>
<th>Refining</th>
<th>Transport</th>
<th>Distribution</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude oil</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BASE PRICE</td>
<td>IBLC</td>
<td>RPP</td>
<td>WHOLESALE</td>
<td>PUMP</td>
<td>import margin</td>
<td>refiner margin</td>
</tr>
</tbody>
</table>

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Criteria for Regulation

Two generic factors drive an industry toward regulation: the lack of effective competition and the inefficient use of resources. Of course, no fixed rules exist for determining the need for price controls, so the decision relies on sound judgment. Below are some broad criteria for determining the need of a regulatory system. Before adopting price regulation, countries should see whether they can change enough of these constraints so that regulation can be avoided.

Ineffective Competition

Only in a fully deregulated system can one expect competition—not under an administered price system. Structural characteristics indicative of ineffective competition include the following:

- **Limited market.** In any segment of the market, efficiency requires effective competition. Some markets show little competition despite all the factors being in place, the smaller marketers being happy to enjoy the large margins obtained by the larger players. Theories abound as to the number of competitors required to make such competition likely, but it is held here that five to six competitors are required, with the largest having no more than 20 to 30 percent of the market. The reality is that some segments, such as refining, may not have that many competitors for a long time. Such segments may be regulated differently from others in the chain.

- **Excessive power or responsibility lodged in the state oil company.** The state oil company, because of past policies, may enjoy unfair advantages after it is commercialized and begins to compete with other companies. Also, the company may have many responsibilities beyond its operational ones, such as policy administration. Such duties detract from its ability to operate efficiently.

- **Excessive barriers to entry.** This concept generally applies to physical assets such as storage. Control over assets by incumbent players creates a barrier to entry that may prevent competition. If it appears that potential new market players are staying away because of such a circumstance, regulatory action may be justified. Note that barriers to entry may include nonphysical assets, such as licensing requirements.

- **Excessive integration.** An industry player may have too much power by virtue of its integrated activities. For example, if it is both a supplier and buyer and holds a large market share in one of those segments, it has an inherent conflict of interest.

- **Excessive capacity.** In situations where there is significant excess capacity throughout the industry, companies may refrain from real competition so that all can remunerate their assets.

Inefficient Use of Resources

Characteristics indicative of inefficient use of resources include the following:

- **Excess capacity.** It is possible that a country has too many assets of one kind, and regulation may be justified to prevent further unnecessary capital spending. This
Industry Structure and Potential Need for Regulation

could happen, for example, when companies do not allow third-party use of spare storage capacity.

- **Limited availability of foreign exchange.** If the availability of foreign exchange to purchase crude or products is limited, regulation can be used to ensure fair access to this scarce resource. Lack of proper budgeting and fiscal discipline invariably increase the problem.

- **Economically unjustifiable subsidies.** If subsidies have been required to maintain a participant or an asset, and if that asset cannot be justified on genuine strategic grounds, action may be justified. Similarly, countries have subsidized certain products, or the supply of products, for selected industries (for example, agriculture and transport). These subsidies lead to excess consumption, possible feather-bedding of supplies, and misuse.

- **Limited service area.** It is critical to provide service to all parts of the country where it can be economically justified over the long term. Regulation ought to facilitate establishment of service to remote areas, but in practice the failures of the regulatory system are often the cause of product shortage.

- **Poorly prioritized imports.** Restructuring and regulation can correct deficiencies in the prioritization of imports. Some systems fail, and countries then are saddled with an abundance of unnecessary products.

**Objectives of Regulation**

If it is concluded that regulation is required in the transition toward a liberalized market, the key objectives of a regulatory system are as follows:

- Limiting potential abuse of monopoly in areas where competition is minimal
- Allowing for a reasonable reward for petroleum marketing and thus encouraging competition
- Providing incentives for efficiency and incentives to invest (or not to, if more appropriate)
- Encouraging efficient *nationwide* distribution and marketing—while recognizing lower throughput in some areas and establishing distance differentials
- Allowing prices to reflect the international oil, currency, and capital markets through transparent, timely, and prompt price reviews.
- Defining and maintaining
  - internationally acceptable quality for all products
  - internationally acceptable environmental and safety standards
  - sufficient stock as stipulated in the market margin
  - rules and codes of conduct for all participants including new entrants.
Once a regulatory mechanism is established, a monitoring body will be needed to maintain records and report what is happening in the industry, as specified by the regulatory mechanism.

In summary, the capital intensity and commodity nature of the business lead competitors to seek maximum capacity utilization and minimum unit operating costs through economies of scale and scope. These factors in turn push companies to integrate vertically by participating in multiple segments and horizontally by taking as much market share as possible. These processes can lead to inefficiencies, in the absence of competition. Barriers to entry are exacerbated by inefficient competition, creating a “snowball” effect. Thus, when structural analysis indicates such situations, regulation is a necessity. A regulated industry should be seen as an interim step toward a liberalized market with healthy competition.

The above discussion has been deliberately general to provide an overview of the market characteristics that may call for control. Once the decision to regulate has been taken, implementation becomes the difficult issue. An analysis of the business environment and petroleum pricing issues specific to Africa will illustrate the difficulties of implementation and lead in to the discussion of the proposed pricing system.
The Business Environment for Petroleum in Africa

The petroleum product supply business is influenced by two factors: the fundamental business activities and the location. Several contextual factors affect all businesses in Africa, and many profoundly influence the supply of petroleum products. The net effect of these factors is to increase the cost of doing business in Africa and to increase the risks discussed in the previous chapter. In addition, the market is more concentrated and thus open to price abuses and inefficiencies. The criteria for evaluating the business environment—which indicate the need for controls and influence the design of regulatory structures—are discussed in context of the sample of the four African countries and are as follows:

- **Market size.** African petroleum markets are very small by world standards. Therefore, for a capital-intensive business, extreme concentration of market shares opens the way for potentially abusive pricing practices. Participants in the sample countries have market shares as high as 60 percent.

- **Barriers to entry.** The markets of the sample countries exhibit many significant barriers to entry, especially in the import and refining areas. In most cases, tankage is held by a few companies, and this could effectively prevent new entrants. The same can be said about refining; although it is not essential to have a refinery, tankage is required in any case. Other barriers exist outside of fixed assets. Inefficient and nontransparent regulatory systems can strongly discourage new competitors. Likewise, the lack of supporting infrastructure—particularly the lack of efficient railroads—discourages companies wishing to supply areas away from the main depots.

- **Integration.** Some segments of many of the product supply systems in Africa are heavily integrated. In many of these cases, supplier and buyer are the same entity, and that entity has a sizable market share in one or both segments. For historical reasons, it is often the state oil company that enjoys these potentially damaging advantages. It need not be so; some countries have divested a monopoly activity.

- **Capacity.** Many countries have excessive capacity because of market shrinkage, inefficient policies, and/or excessive spending in the past.

- **Currency and foreign exchange.** Currency problems are endemic in Africa. Most countries have very limited foreign exchange reserves, for which many sectors
compete. One noticeable policy impact has been restrictions on profit repatriation, which in turn discourage entry. In addition, local currencies have been trending downward for years, resulting in high inflation in local terms. These factors also place significant burdens on existing product pricing systems.

- **Subsidies.** Subsidies are common in Africa. They cover refining, retail prices, and inland transportation, among other things. The net effect is inefficiencies, as consumers and competitors have little incentive to cut costs or make rational (economic) buying decisions. Subsidy systems also invite fraud.

Even this broad overview of the product business in Africa shows clearly that for the moment regulation is a necessity in most countries. Many issues must be addressed in designing and implementing an efficient regulatory system, however. Note that any regulatory system necessary in Africa based on our observations could be characterized by the objectives noted in the previous chapter.
Discussion of Issues

The issues to be addressed in establishing and implementing a price control system fall into three broad categories:

- **Policy issues** are those set at the highest government levels and are driven by overall objectives of the government including political and strategic considerations.
- **Institutional and implementation issues** are concerned with the questions of “Who does what and how.”
- **Structural issues** revolve around the industry and how the companies in it will effectively and efficiently compete.

Policy Issues

**Assessment**

The previous two chapters have dealt with the assessment process. Here it may just be noted that governments must assess the performance of the petroleum product business and its role in the economy as a whole. Petroleum products supply about three-quarters of the commercial energy in Africa, and taxes collected on their sale represent the most important government revenue in many countries.

**The Need for Change and Long-Term Vision**

Often, the most difficult policy step is accepting the need for change and forming a vision of the path toward the long-term goal of liberalizing markets and allowing competition. Proper analysis will indicate which segments and products need to be regulated and to what extent. Most African nations need regulation, and existing systems are not working well. Governments must take these steps and openly accept the analytic results when they indicate that change is required, even if it is painful.

**Role of Governments**

After establishing the need for change, the government must settle on its own role. In many countries, the final decisions on price changes have long been made by the government. A transition to market-led pricing may well create a political problem among
Regulation of Petroleum Product Pricing in Africa

Consumers, who have become accustomed to a particular price regime. It is worth noting also that in 1994 and 1995, international oil prices were on a generally stable downward trend. Price systems that worked well in this unusual stability may not work well in a more volatile market. Nonetheless, governments cannot control the prices of their imported oil and products, and pricing systems and decisionmaking must reflect this. Governments thus should remove themselves from the pricing decision. That done, public entities can take part in three important roles: policy, administration, and operation. It is essential that governments play their chief role in policy, delegate administration to the civil service, and ensure that operations are in the commercial sector. Not to do this will invite potential for conflicts of interests where the same individual is sometimes required to be a policymaker, regulator, and a member of the board of a state oil company. In summary, the government should set policies and, if a regulated market is required, have a proper regulatory regime that monitors what is happening in practice.

Petroleum Prices Should Reflect Economic Cost

Governments must recognize that a fundamental requirement for proper working of the market is for prices to reflect true economic cost. This philosophy relates to three practical areas: subsidies, isolated markets (up-country areas and inland countries), and oil price and exchange rate variations.

In general, subsidies lead to inefficient fuel use or substitution and activities not in the country’s best economic interest. In addition, subsidy systems always provide an opportunity for fraud. Subsidies therefore should be avoided to allow for rational purchasing choices. Subsidies are best used as temporary measures for a specific purpose—for example, subsidizing a refinery while alternative supply arrangements are being made.

Up-country areas must face the reality that higher transportation costs make certain products more expensive. At the same time, pricing formulas should recognize the lower throughput volumes in these areas and provide incentives for companies to supply product. Consumers must look to alternative fuels if the economics dictate. Likewise, inland countries must consider their location; rather than subsidize some fuels, they may be best off considering different fuels or mixes of products. The choice of the most efficient means of transport is important as well (see Infrastructure, below).

Most systems try to shield consumers from oil price and exchange rate variations, usually through subsidies. As noted, this is a dangerous business for any government. If these prices are not passed through, consumers cannot make rational purchasing choices. Moreover, few African governments can afford to subsidize oil imports.

Infrastructure

Infrastructure is critical to the petroleum sector, however much of this investment is outside the control of the industry participants. One example is railroad systems, which often are the most economic means of transport. Many railroads have behaved as monopolies and have refused to accept liability for performance and losses. Fortunately, this attitude is changing, as it has to if railroads are to compete on the same terms as road transport. Other railroad inefficiencies result from inadequate rolling stock, poor operating
conditions, and lack of information systems. Because of this, operating costs for the sector increase, as does the risk of catastrophe. Governments must be willing to force a change in attitudes in the public sector, and to provide infrastructure support to achieve an efficient market.

Institutional and Implementation Issues

Administrative Capacity

Any transparent and efficient system must rely on the effective working of administrative bodies. Many African nations have a limited capacity to administer regulatory systems. In many cases, this simply reflects a lack of training and experience, and lack of independence of the regulator. Still, because of this “capability gap,” their policies have been characterized by sudden and unpredictable changes that discourage competitors. Effective reform will require a training component to identify required administrative skill sets and begin training. In the meantime, independent outside help can be used in combination with some degree of self-regulation, as multinationals often have internal controls that are more sophisticated than those of many governments.

The State Oil Company

State oil companies should not have any regulatory responsibilities and should not represent the government to industry. This situation is all too common in Africa, and it undermines the working of the market. In cases where it is engaged in product marketing, the state company enjoys unfair competitive advantages. On the other hand, where the state company imports on behalf of the nation, distributors may be slow payers and take unauthorized credit. Some state companies are distracted by extraneous noncommercial responsibilities. The state oil company thus should operate as a strictly commercial entity. This means that its management should not comprise government officials but rather seasoned operational and financial managers. The company should be controlled through a clear delegation of authority setting responsibilities, budget processes, and performance (e.g., profit) targets.

Decisionmaking Process

Many African systems encounter difficulties by failing to review and adjust prices often enough. As exchange rates and oil prices vary, importers and marketers can face financial ruin and in some cases require subsidies to stay afloat. A price system can avoid these pitfalls by providing for frequent reviews and the appropriate pass-through of exchange rate and cost variations. Price changes should be automatic and communicated by the administering agency—say, the Ministry of Energy.

Price Reviews

The review of Africa systems indicates a wide range of policies for reviewing prices but suggests a rather consistent practice. That is, the sample countries generally had policy provisions for reviewing prices ranging from twice a year to monthly, but in most cases they
conducted the reviews so infrequently as to be ineffective. Some countries attempted to respond to the need for frequent price changes by basing prices on forecasted oil prices and exchange rates. It is too well known that such forecasting is a dubious business. Moreover, basing prices on forecasted inflation may in fact cause that inflation to happen—a self-fulfilling prophecy. Therefore, price reviews should be based on actual costs and reviewed often. Countries must face the administrative realities of reviewing data and build that capability with outside help over the short term, using independent auditors if necessary. Many countries do not change pump prices until the formula results in a change in excess of a threshold, usually 5 percent. This is an acceptable practice if a mechanism is provided to compensate for the cost of delaying the price adjustment.

Costs

Operating costs include elements that vary with the oil price, exchange rate, and domestic inflation. Therefore, costs should be separated into local and foreign exchange components. In a cost-plus system, accurate and actual costs must be used as inputs. Also, an incentive to save and not just simply pass costs on to the consumer must be present. The next chapter presents such an incentive. Costs will include cash and noncash operating costs. The cash costs include those related to import, storage, transport, and handling of product and crude. Noncash items cover mostly depreciation and amortization. Financing costs for importation should be included, but financing costs for working capital should not, unless there is a specific reason that working capital requirements are higher than common practice.

Allowable Return on Assets

The pricing formula must allow for a cost recovery element and a return on assets employed in the participant’s activity. It is first necessary to compare a return in a country with those in other countries. The present four-country sampling had a range of returns from about 17 to 26 percent on an after-tax basis. These returns are high compared with, say, South Africa, where the allowed after-tax return is about 10 percent. But comparisons must be used with caution, as some countries have higher risk than others, and companies operating under higher risk deserve access to higher returns. So, the second consideration is an assessment of the risk points covered earlier. The permitted return should be compared then with other countries with similar risks. This should be reviewed reasonably often—say, three to five years. Finally, caution must be taken in the comparison to ascertain whether returns are real or nominal—that is, adjusted for inflation or not (and that in intercountry comparisons appropriate adjustment is made for inflation).

Creditworthiness

Many African entities—public and private—are poor credit risks. In small markets, a single default in the product chain can disrupt the entire supply system. If one entity cannot pay its receivables, it is possible that small participants upstream will default to their suppliers as well. Unless there is “coercion,” large participants will cease supply until arrears are corrected. The use of political pressure to force supplies—as happens in some of the countries—is totally inappropriate for countries seeking foreign private investment.
Subsidies should be avoided. If a market participant exits for this reason, the market may need to be reanalysed and controls put in place to ensure that the market continues to work effectively. Avoid the formation of black markets at all costs.

**Local Management Pool**

The candidate pool for local management is extremely limited in Africa. Consequently, most oil companies rely on expatriate management, which increases cost. Systems that intend to establish companies on a commercial basis in the long term thus should include provisions for training local management and staff.

**Industry Participants**

Too often, the relationship between the industry participants and the government is acrimonious; both the governments and industry members are responsible for this. The industry should be invited to express views and opinions in designing a system. In certain segments where a temporary monopoly is to be allowed—for example, imports, as discussed below—participation in that agency by the companies will ensure their cooperation and utilize their skills. If self-regulation is needed because of limited in-country capacity, participation by companies in a “watchdog” group is advisable.

**Data**

Of course, high-quality data are essential to commercial operation in the sector. The confidentiality of companies’ data thus must be respected at all times. Mechanisms within the regulatory body should be in place to ensure this. Independent auditors may need to examine the data from time to time to ensure that participants are complying with disclosure and other requirements (discussed under Costs).

**Structural Issues**

The structural issues involve two basic questions:

- What degree of horizontal integration is appropriate for each segment—that is, where is a monopoly appropriate?

- What degree of vertical integration exists and is beneficial?

Typically, import and refining may each be done by a single entity, but this then creates the need to control this entity. Price controls generally would cover basic fuels and not special products such as lubricants.

**Importation**

In most of the African economies (those that are too small for import competition), compelling arguments support the granting of a monopoly position for importation, providing it is done on a competitive, arm’s-length basis. First, economies of scale come into play, particularly when import volumes are insufficient to justify multiple players. Second, the limitations of foreign exchange are greatly mitigated when a single entity acts as importer, because scarce foreign exchange is used more efficiently, and unnecessary
competition to secure it is avoided. Third, a single entity facilitates the efficient administration of a transparent procurement process. Administrative costs are kept to a minimum. Where imports consist of products rather than crude, the presence of a single entity simplifies the prioritization of import requirements. In establishing a single importing agency or company, however, the government must ensure that new entrants in the sector are not deterred and that they will have access to imported goods. The importing agency could have one of two structures—a joint venture company or a procurement committee. In either case, all market participants should be involved.

**Refinery**

One important question is the need for a refinery. In principle, consumers should not pay more for products refined in their country than for imported products. Oil refining is a highly capital intensive activity. Both its capital and operating costs are mostly hard currency. In addition, this activity provides few jobs in proportion to the required investment. As mentioned previously, many African countries are short of capital, especially hard currency. Thus, the opportunity cost of operating a refinery is quite high. Pricing systems therefore should not subsidize the operation of a local refinery, except as a strictly temporary measure while alternative supply arrangements are being made. Many times, arguments are made that a refinery brings unquantifiable benefits to the local economy. These benefits appear to be small in relation to cost.

**Storage**

Where distributors control most or all primary storage facilities, two specific problems may arise. First, a barrier to entry is created, as discussed above. Second, companies may defend their market positions by building new tankage when existing facilities are underutilized. This duplication is wasteful, and the consumer pays for it. Central ownership is a possibility; however, efficiency and operating standards are likely to be higher in the private sector than in a monopoly. A system that supports open access will ensure no barrier to entry and will discourage duplication. Very often the infrastructure available—ports capacity, handling facilities, lack of storage for larger tanker handling, inefficient road or rail systems or both, inadequate storage in various distribution areas, and so on—does not permit efficient storage and distribution. Very often oil marketing companies function without sufficient storage and manage by daily trucking the products and using rail tank wagons as storage facilities.
A Proposed Price Regulatory System

The system previously described is a cost-plus system. As noted during the report, this system is the most appropriate because of the low throughput volumes. Participants must be sure of reasonable cost recovery if they are to participate. Several alternative systems are operating, however.

In the Spanish system, maximum prices are set at the same level as prices in nearby countries of a similar size to Spain and with free markets. The prices are adjusted for differences in tax levels and import costs. This system does not seem appropriate for Africa, as practically all countries’ markets are at a developmental stage that still requires price controls. Also, markets in Africa are difficult to compare with one another.

The current South African system is another alternative. It employs a cost-plus system that is supplemented by a retroactive calculation of margins actually achieved by the industry. Industry profit levels outside an acceptable band are compensated for by adjusting prices in future periods. This system provides a potential solution to a number of the problems inherent in a cost-plus system, but its operation requires an effective and highly competent regulatory body.

Finally, complete price liberalization is found in the United States. This system only works in countries where the size of the market, diversity of the participants, and lack of market share concentration ensure healthy competition. This is the ultimate goal for Africa, of course, but it is not the case in most African markets today.

Policies

The policy aspects are as follows:

- All policies are set by the government at the cabinet level.
- Petroleum product prices will reflect economic cost, and subsidies will be avoided.
- The price should be based on import parity prices (FOB and freight and insurance separate) for each product, plus actual industry average costs and an allowable return on industry assets. The system should consider an importer’s margin, a distributor’s margin and a retail margin.
All three of these margins will be fixed margins based on comparable data from other similar markets.

The prices should vary by region, to reflect transport and other cost differentials.

Discounting from the formula price should always be permitted, provided such a discount does not constitute "predatory" pricing, that is, selling below marginal cost.

Special products, such as lubricants, international aviation fuel and marine bunkers should not normally be subject to price controls.

Where necessary, open-access rules will apply.

**Institutional and Implementation Aspects**

The institutional and implementation aspects are as follows:

- The regulatory agency will be established within a larger independent regulatory agency, if one exists; failing this, it should be set up within an appropriate ministry and staffed by civil servants. Moreover, an independent monitoring body should be charged with keeping records of regulatory activities.

- The state oil company, if one exists, is an autonomous organization competing in parity with other market participants.

- The maximum wholesale price and the maximum pump price of each main product in the domestic market should be set by formula.

- The pricing formula should be recalculated regularly, preferably monthly or each time an import shipment is received if that frequency is longer. Price changes should be made automatically.

- Product quality, safety, environmental aspects, and so on should be monitored.

**Structural Aspects**

The structural aspects are as follows:

- An import monopoly is granted to a joint venture company or a buying cooperative with oversight by a procurement committee consisting of representatives from all of the distributors.

- Tank capacity will be available to all distributors (e.g., open access).

**Base Price**

For the base price, Case 1 and Case 2, respectively, are treated as follows:

- **Case 1:** The base price is the price actually paid for the crude oil, CIF main entry port.
Case 2: The base price is the price actually paid for the products, CIF the main entry port. So as to adjust prices regularly, the CIF price should be broken down into FOB and components.

In-Bond Landed Cost

Whereas IBLC and refined product prices are normally established in local currency, in countries where devaluation is rapid it may be appropriate to set these prices in dollars. This has the advantage of helping to keep the price current, and also impacts any distributor who is a slow payer. With regard to IBLC, the following considerations apply:

- The IBLC for crude or product includes the base price plus all port charges incurred by the importing agency, plus the agency’s import margin, and is usually expressed in local currency.
- The import margin is based on costs and assets involved in importation, storage and handling. It is equal to the actual costs of the agency plus a return on the specific assets, averaged over the expected annual volume of imports by the agency.
- The agency’s costs include all cash and noncash operating, maintenance, and administrative costs, including costs related to the financing of oil imports. They include any payment made to the oil marketing companies for the use of their assets.
- The costs should be taken from the agency’s actual accounts, building in an incentive to do better.
- As stated, the IBLC should be calculated monthly, or for each shipment if the expected interval between shipments is more than a month. The exchange rate used should be the commercially available rate on the day the calculation is made.

Refined Product Price

The following considerations apply to Case 1 only:

- The refined product price should be the lower of the two prices discussed below: maximum refined price and actual refined price.
- The maximum refined price of each product is the Platt’s mean Mediterranean price plus (a) spot freight from a major market—say, Genoa—to the entry port plus insurance and losses at rates consistent with good industry practice and with conditions at the entry port and (b) the import margin, as discussed above.
- The actual refined price is the IBLC plus the refiner’s margin. The margin should cover all cash and noncash costs related directly to refining crude and storing finished product plus a fixed profit per unit volume of product.
- If the actual refined product price is greater than import parity plus import margin, then the refinery is operating at a loss or economic cost to the country. If this can be rectified through remedial action, then this should be done. Otherwise, the refinery should be shut down and subsidized only until arrangements are made to import product.
Distribution Margin

The following points apply to the distribution margin:

- This is equal to the actual distribution costs of all marketers plus a return on their assets employed in distribution, averaged over the volume.

- Industry costs include all cash and noncash operating, maintenance, and administrative costs. Financing costs of working capital are not normally included, though they may be if working capital requirements are much higher than normal industry practice. Margins per liter for all main products should be about equal.

- Where transport costs to an up-country depot from an entry port or main product terminal are significant, they should be reflected in a system or regional cost differentials. These differentials may be calculated from actual transport costs incurred. These actual costs should be excluded from the general calculation of the distributor margin to avoid double counting.

Retail Margin

The retail margin should be treated as follows:

- The margin should be set by the formula and not negotiation.

- The oil marketers should provide information on the economics of their sites.

- The total site income after operating costs should provide an acceptable rate of return on assets employed. The rate of return should be the same as is permitted to distributors.

- Returns from nonfuels sales, especially lubricants, should be included in the return calculation.

- The margin should be spread over the sales volume per site, which may be different in rural and urban areas. The volume may be the average for the region, but it could be above or below if the intention is to force site closures or stimulate investment.
Annex 1: Mozambique

Description of Industry

The Department of Energy, part of the Ministry of Mineral Resources and Energy, has overall responsibility for petroleum industry affairs. Its routine tasks include the calculation of price adjustments.

Petromoc is the wholly state-owned national oil company. At the time of writing this paper, it had a monopoly of product imports, but in other respects operates like a normal oil marketing company.

For several years after independence—which came in 1975—the domestic market was split between Petromoc and BP, with stable market shares of about 75 percent and 25 percent, respectively. Recently, Mobil and Total have re-entered the market—they had both been present before independence—and have achieved market shares of 5 to 10 percent (Mobil) and 0 to 5 percent (Total). BP’s share has reached 33 percent, whereas Petromoc’s has fallen to 55 to 60 percent.

BP has a near 100 percent share of the jet fuel market and is the only marketer of avgas. It also operates the country’s only lubricants blending plant, but it blends for other companies.

Caltex operates in the bunker market but has no domestic sales. Moçacor—owned 75 percent by Petrogal and 25 percent by Petromoc—is currently the only LPG marketer, although it does not have a legal monopoly. Both are considering entering the domestic petroleum products market.

Size of Market

During the recent war—the cease-fire was signed in October 1992—communications between Maputo and much of the interior of the country were severely disrupted, and industrial activity outside Maputo was reduced virtually to zero. Demand in the interior is still well below prewar levels. About 65 percent of the market volume is in Maputo and 20 percent in Beira, with much of the rest concentrated near the coast. Distribution is by sea to some minor ports; otherwise it is entirely by road, though the country has a railway network, which is currently being rehabilitated.

Domestic oil product consumption was 340,000 tonnes in 1990.

A significant feature of the market is the level of transit business to other countries. Coastal storage facilities at Beira are geared to Zimbabwean demand, which, at 922,000 tpa (1990), is more than twice the size of the Mozambican market. Imports to Malawi are currently unloaded at Dar Es Salaam, in Tanzania, and travel by rail and lake barge to Malawi. The nearly completed rehabilitation of the railway line from the port of Nacala in the North of Mozambique will provide an alternative route.
Transit business through Maputo—which should be the most economical supply point for Swaziland and the Eastern Transvaal area of South Africa—may increase substantially. The tankage already exists at Maputo to serve this market, although some of it may be in poor condition.

Supply of Petroleum Products

At present, oil product supply into Mozambique is almost entirely donor financed. A Petroleum Working Group comprising representatives of aid donors, the oil marketing companies, the Department of Energy, and the Central Bank oversees the procurement process and ensures that donors' stipulations are met regarding tender procedures, allocations of product, and so on.

By Mozambican law, only Petromoc had the right to import main products.1 Petromoc therefore took responsibility for the administration of imports, from the issue of requests for tender to the receipt of product. The functions of the Petroleum Working Group are as follows:

- Reviews stock reports and sales forecasts submitted by the companies; reviews availability of hard currency; plans product requirements, and provides Petromoc with a forward program.
- Assists as necessary in the review of tenders received.
- Settles any issues that may arise concerning allocation of imported product to marketing companies and other related issues.

Main products are imported through the ports of Maputo, Beira, and Nacala, all of which can take vessels of up to 25,000 tonnes (perhaps 30,000 at Beira). On arrival, the product is usually unloaded directly into the tankage of the company to which it has been allocated. A major disadvantage of this system from the point of view of the private sector companies was that only Petromoc’s product is regarded as stored in bond. Other companies had to pay duty when the product was pumped into their tanks. (Proposals to remedy this have recently been approved by the Council of Ministers.)

LPG (which is imported by rail), bitumen, avgas, and lubricants (including base oils), may be imported by any company.

The 1993 Price Formula

In June 1993 the government of Mozambique implemented a new system of fixing maximum prices for the sale of oil products. The system had been developed by a firm of international consultants to meet conditions set by international aid donors, who felt that

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1. A new petroleum import system came into effect in 1997. All petroleum distributors licensed to operate in Mozambique are shareholders in a not-for-profit petroleum import company. This company imports on behalf of its members. All costs are shared in proportion to imports, and each company is responsible for its own finance.
the previous system provided the oil marketing companies with no incentive to invest in Mozambique and that progress should be made toward price liberalization.

The formula was regarded as an interim measure, as it was extrapolated that the role of Petromoc in the Mozambican market was likely to change and as the lack of reliable information on industry costs and assets made it very likely that adjustments to the margins would be needed. The method of calculation is described below; the actual cost figures have recently been finalized.

**The Price Calculation**

The importer sells to other marketers at the import ports (Maputo, Beira, and Nacala) at a wholesale price built up from the following elements:

- Actual CIF cost of the product supplied.
- The importer’s margin.
- Taxes and duties.

The formula also specifies a pump price that contains, in addition, these elements:

- The distributor’s margin.
- The retail margin.
- A turnover tax.

Pump prices are recalculated quarterly by the Department of Energy to take account of changes in CIF costs (using average of preceding quarter) and the exchange rate (using latest rate at time of calculation). Adjustment of pump prices to the newly calculated price set each quarter is automatic, although no change will take place unless CIF costs expressed in Meticais change by at least 5 percent. There is provision for a short delay in posting the revised prices, as the government has the option of keeping prices stable by adjusting tax rates. However, this aspect did not work well in practice as, instead of tax adjustments, Petromoc was forced to shoulder this burden.

**Permitted Margins**

All three margins—importers’, distributors’, and retailers’—are intended to allow full recovery of operating costs plus a return on assets employed of 35 percent pretax (17.5 percent after tax).

The three layers of margins are divided into their Metical and foreign exchange components. The latter are adjusted quarterly for changes in the Metical/dollar exchange rate. Local currency costs will be adjusted annually for inflation, but the adjustment will be limited to 75 percent of actual inflation to provide an incentive for cost saving.

The calculation gives the permitted maximum selling price at the import ports; prices at minor ports and inland are higher to allow for higher transport costs.
Problems of Implementation

Oil marketing companies operating in Mozambique raised objections to the levels of margins permitted when the new system was introduced in June 1993. Some changes were made to the original proposals. The points of disagreement between the parties provide some insight into the problems that may be encountered in the implementation of a built-up cost system of price controls.²

- As Petromoc had a monopoly of product imports, all estimates made by the consultant of the appropriate level for this margin depended on figures provided by Petromoc from its accounts. Unfortunately, these accounts did not separate importation-related from distribution-related costs and assets. Experience since the system was introduced indicates a major under-recovery by Petromoc on imports.
- As Petromoc had a monopoly of importation but faced competition in distribution, any misallocation of costs and assets between these sectors could have a very significant effect on its competitive position.
- In any case, the dividing line between importation and distribution is not well defined. Oil marketing companies with their own terminals at the main ports usually arrange for product to be unloaded from the ship directly into their own tanks. Are these tanks part of the importation function?
- Mozambique has a clear surplus of terminal capacity, partly because of the scale of its transit business. There is a question of how much of this capacity should be counted as assets employed for the purpose of calculating return on assets.
- The marketing companies’ operating costs and assets need to be allocated between domestic and transit business and between fuels and specialties.

Visit Details

The consultant visited Maputo from April 19–22, 1994, and met with the following:

<table>
<thead>
<tr>
<th>Department of Energy</th>
<th>Mr. M. Ruas, Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mr. A. Rodrigues, Petroleum Advisor</td>
</tr>
<tr>
<td>Petromoc</td>
<td>Mr. M. Viola, Managing Director</td>
</tr>
<tr>
<td></td>
<td>Mr. L. King, Commercial Director</td>
</tr>
<tr>
<td></td>
<td>Ms. T. Moreira, Finance and Planning Director</td>
</tr>
<tr>
<td>BP Moçambique, Ltd.</td>
<td>Mr. J. Sandercock, Managing Director</td>
</tr>
<tr>
<td>Mobil Oil Moçambique</td>
<td>Mr. W. Bennett, Managing Director</td>
</tr>
<tr>
<td>Total Moçambique SARL</td>
<td>Mr. B. Fontanges, Managing Director</td>
</tr>
</tbody>
</table>

². Proposals to resolve the problems of industry structure and of pricing were resolved by the Council of Ministers and covered in a Petroleum Decree (1/97).
Annex 2: Sierra Leone

Description of Industry

The Department of Trade, Industry and State Enterprises has overall responsibility for oil industry matters and is responsible for setting oil product prices, as described below.

The Petroleum Unit—part of a public sector management support unit funded by aid donors—is responsible for the administration of the petroleum pricing structure. It also monitors the oil sector and advises the Department of Trade on oil-related matters.

The National Petroleum Company (NP) is owned by the government (60 percent) and the Precious Mineral Marketing Company (40 percent). The latter company is itself partly state owned. NP was originally owned 100 percent by BP, with which company it still has a technical agreement. It bought Agip’s assets when that company left Sierra Leone.

NP has no quasi-governmental functions and no special role in the importation of oil products to Sierra Leone. Its oil marketing activities are comparable to those of Shell and Mobil, though in practice it wins most of the tenders for supplies to governmental and parastatal bodies. It is the largest marketer, with a 35 percent share of the total market.

The retail market is split between NP, Shell, and Mobil. Two small companies—Unipetrol Sierra Leone and Chrismel—have significant shares of the bulk market and very small shares of retail. Unipetrol Nigeria is about to enter the market.

A small refinery—distillation capacity about 10,000 bpd—shut down in 1992 and is in liquidation. The government has called for tenders from organizations interested in reopening it.

A very noticeable feature of the Sierra Leone market is the density of retail sites. It is common to see two or three competing sites close to a major road junction, and the average distance between sites is unusually low.

Current System of Oil Supply

There are no restrictions on importation of oil products to Sierra Leone other than those imposed by availability of facilities for reception and storage and by availability of foreign exchange. Largely because of the latter problem—the country is chronically short of hard currency—about two-thirds of all product imports are financed by aid donors, of which the most important is the World Bank. Imports funded by donors are purchased by an open tender. Tenders are put out in the name of the funding organization and coordinated by the Petroleum Unit. The product, once received, is stored in tanks owned by the three largest oil marketing companies, which receive rental for use of their facilities. They are obliged to supply donor-funded product to companies that do not have their own storage.
Imports by third parties (i.e., not donor funded) are significant (Table A2.1). For kerosene and gasoil, the split between third-party and donor-funded is about 50/50. The largest third-party importers of gasoil are Sierra Rutile (mining) and Salcost (a hydroelectric project). Jet fuel is imported mainly by the oil marketing companies, presumably mainly for international bunkers; donor financing does not cover imports for this purpose. The oil marketing companies also import product to meet the requirements of customers prepared to pay in U.S. dollars. These now account for about 10 percent of the market, according to one estimate, though the proportion is decreasing.

### Table A2.1 Imports by Sierra Leone's Petroleum Unit (Donor-Funded) and Third Party

<table>
<thead>
<tr>
<th></th>
<th>PMS</th>
<th>Kerosene</th>
<th>Gasoil</th>
<th>Fuel oil</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1992:</strong> June through December</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Unit</td>
<td>19,442</td>
<td>7,270</td>
<td>19,139</td>
<td>10,274</td>
<td>56,125</td>
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<tr>
<td>Third party</td>
<td>600</td>
<td>6,660</td>
<td>4,962</td>
<td>-</td>
<td>12,222</td>
</tr>
<tr>
<td><strong>1993</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Unit</td>
<td>39,329</td>
<td>9,064</td>
<td>21,652</td>
<td>12,925</td>
<td>82,970</td>
</tr>
<tr>
<td>Third party</td>
<td>3,392</td>
<td>10,086</td>
<td>32,290</td>
<td>6,479</td>
<td>52,247</td>
</tr>
<tr>
<td><strong>1994:</strong> January through April</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Unit</td>
<td>11,524</td>
<td>6,065</td>
<td>5,828</td>
<td>15,476</td>
<td>38,893</td>
</tr>
<tr>
<td>Third party</td>
<td>3,387</td>
<td>5,598</td>
<td>3,401</td>
<td>-</td>
<td>12,386</td>
</tr>
<tr>
<td><strong>Total for period</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petroleum Unit</td>
<td>70,295</td>
<td>22,399</td>
<td>46,619</td>
<td>38,675</td>
<td>177,988</td>
</tr>
<tr>
<td>Third party</td>
<td>7,379</td>
<td>22,344</td>
<td>40,653</td>
<td>6,479</td>
<td>76,855</td>
</tr>
<tr>
<td>% Third party</td>
<td>9%</td>
<td>50%</td>
<td>47%</td>
<td>14%</td>
<td>30%</td>
</tr>
</tbody>
</table>

### The Pricing Formula

**Product Landed Cost**

The petroleum products pricing formula is based on the tender price CIF Freetown, which is made up of Platt's mid-price FOR Med. on bill-of-lading date, plus a premium.

The Petroleum Unit calculates a revised price each time a product shipment arrives—about every six weeks on average. The calculation is based on the actual cost of the product (i.e., Platt's on b.o.l. date plus tender premium), to which is added import duty (at 5 percent of CIF), port charges, demurrage/inspection (at a standard rate), freight levy and a storage fee of $4.70 per tonne, which is paid (in Leones) to the oil company in whose tanks
the product is stored. This is a one-time payment, not related to the length of time for which the product is actually stored.

This landed cost in $/tonne is converted into Leones per Imperial Gallon (IG) using a standard density conversion factor and the highest Le/$ rate quoted by commercial banks on the b.o.l. date.

**Pump Price**

The maximum pump price for Freetown is made up of the landed cost, taxes, and duties, and a distribution margin fixed at $0.24 per IG for white products and $0.20 for fuel oil. This is payable in Leones at the exchange rate used in the price calculation. The distribution margin is intended to cover marketers’ costs, transport costs (Freetown area) and dealers margin. The amount actually paid to transport operators and dealers is fixed by agreement among the oil marketing companies.

Outside Freetown, prices vary by area. The transport cost adjustment for each area is agreed among the oil marketing companies.

**Decisionmaking Process**

For each consignment of product (i.e., about every six weeks), the Petroleum Unit calculates a revised landed cost. If the result differs from the current cost by 5 percent or less, no further action is taken. If the price change is greater than 5 percent, the Petroleum Unit calculates revised pump prices and notifies the Department of Trade and Industry, which is responsible for announcing the change. In practice, a period of negotiation then ensues. The price set in force at the time of writing (late April 1994) was announced on January 26, 1994, based on Platt’s of December 10, 1993 (PMS, Jet), and December 7, 1993 (AGO). The Petroleum Unit’s calculations, which were available on January 1, indicated price reductions for all products. In the case of PMS, the indicated reduction was in excess of 20 percent. The Ministry finally agreed on a small price increase for all products—effectively, a large increase in tax.

**Taxes and Duties**

As all other costs added to the FOB Med. Platt’s price of products are essentially fixed, any difference between the pump price as calculated by the Petroleum Unit and the price agreed affects only the government’s tax take. Specifically, the ad valorem excise duty is affected; other taxes and duties are fixed. The excise duty on PMS, which was 77 percent of landed cost as of June 1992, rose to 141 percent in March 1993. At that time, the government stated its intention to keep the duty rate close to 140 percent in subsequent price revisions. In January 1994, it was allowed to rise to 255 percent by increasing prices when the formula indicated a reduction, as noted above. This was a temporary measure required because of the high cost to the national budget of the civil war.

The current rates of duty on other products are 174 percent (of landed cost) on AGO, 161 percent on kerosene and 74 percent on fuel oil. Apart from these different tax rates, which have varied in rough proportion over the last two years, there are no cross-product subsidies.
Visit Details

The consultant visited Freetown from April 11–14, 1994, and met with the following:

- **Department of Trade and Industry**
  - Mrs. K. Koroma, Permanent Secretary

- **Public Sector Management Support**
  - Mr. D. Mason, Director, Petroleum Unit

- **Sierra Leone National Petroleum Company**
  - Mr. M. B. Cole, Marketing Manager

- **Shell Sierra Leone Ltd**
  - Mr. N. Araya, Managing Director

- **Mobil Oil Sierra Leone Ltd**
  - Mr. A. K. Omeri, General Manager
  - Mr. R. A. Smith, Accounting and Finance Manager
Annex 3: Tanzania

Description of Industry

The Ministry of Energy and Minerals has overall responsibility for the petroleum industry. Its tasks include fixing the maximum sales prices of main products.

The Ministry delegates responsibility for day-to-day issues to the Tanzania Petroleum Development Corporation (the TPDC). In the upstream sector, the TPDC has the normal roles and responsibilities of a national oil company. Downstream, it is responsible for the procurement and importation of all crude and products, for refining, for administration of the price control system, and for liaison with oil marketing companies active in Tanzania.

The Dar Es Salaam refinery (known as TIPER) is owned 50 percent by TPDC and 50 percent by Agip Petroli. It is operated by Agip, which receives a management fee. Design capacity is 750,000 tpa (15,000 bpd), but actual crude processed has averaged around 550,000 tpa (11,000 bpd) since 1980. It is a simple hydroskimming refinery plus an asphalt plant. The lubricants blending plant at Dar Es Salaam is owned 50/50 by Agip and TPDC and operated by Agip, on a similar basis to the refinery. Capacity is 30,000 tpa.

Of the oil marketing companies active in Tanzania, two (BP and Agip) are 50 percent TPDC owned. Half the directors of each company are nominated by the Government, but there is no state involvement in day-to-day management. These two companies have the largest shares of the total market—in 1992 BP’s market share was 44.4 percent and Agip’s share was 18.6 percent. At the time of the interviews, the other companies active in the market included Caltex, with a share of 12.7 percent and Total, with 10.8 percent. Esso had an 11.4 percent market share in 1992, but sold its activities to Bulk Oil, a Tanzanian company which had previously had only a negligible market share. No other company has a significant share of main product sales.

Supply Considerations

TPDC is responsible for all importation of crude and products. Direct imports by oil marketing companies or consumers are not permitted. The policy of TPDC is to meet as much as possible of its product needs from the TIPER refinery, with any shortfall being covered by product imports. To achieve supply/demand balance, the refinery reexports a large part of its production of fuel oil (Table A3.1).

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3. From 1997, 50 percent of the products are imported by the private sector.
The 1990 Price Control System

Oil product prices in Tanzania have been controlled by the government for many years. Before 1990, industry margins and cost allowances were not permitted to grow with inflation, leading to considerable dissatisfaction on the part of oil marketing companies operating in Tanzania. In 1989, the government commissioned a review of its pricing policy, and in 1990 it introduced a new policy with the following objectives:

- Prices should cover the costs of import and distribution.
- Margins should be set at levels to permit financial viability of efficiently managed marketing companies and should be maintained in real terms.
- The system should encourage the efficient nationwide distribution of petroleum products.
- Timely and prompt reviews should be made to reflect changes in international oil prices, and in exchange rates, and costs allowed should be reviewed at least annually.

The system of price regulation adopted in 1990 has lasted (in principle), with only one significant change, to the present. Both the oil marketing companies and government bodies involved in the petroleum sector seem happy with its objectives, although implementation has clearly been ineffective.

Description of Calculation

The TPDC Computed Price

The price computed by the Tanzania Petroleum Distribution Company (TPDC) is essentially a forecast of product landed costs for the year ahead, taking account of crude and white product landed costs and refining costs. The calculation is made in stages, as follows:
Product sales forecasts and the budget for product yields from the TIPER Refinery give forecasts of white product import volumes and fuel oil export volumes for the year ahead.

Import parity prices for white products are built up from forecast FOB prices (including suppliers premium) plus budget or standard figures for freight and all other supply related costs, including letter of credit and other bank charges. The forecast landed cost of crude is built up in the same way.

A forecast can then be made of the refining margin for the year, valuing crude input and product sales at import parity, as described above, and fuel oil exports at export parity. Refinery operating costs including operator’s service fee are deducted, using budget figures provided by the refinery. TPDC’s most recent computation (see attached) showed a negative margin of $25 million for the TIPER Refinery.

This negative margin is treated as a cost to be evenly distributed between the white products to give adjusted import parity prices. Converted into Shillings at the forecast exchange rate these become the “TPDC Computed Prices.”

**TPDC Selling Price at Dar Es Salaam**

This price set is calculated from the TPDC Computed Price by adding TPDC overheads, TPDC margin, Transport Equalization Fund (TEF) deficit recovery fund, Cross-product subsidy, and petroleum sector rehabilitation fund.

- **TPDC overheads.** These are actual for previous year, adjusted for inflation, for all of TPDC’s activities.

- **TPDC margin.** This is a 40 percent return on fixed and net current assets (excluding debtors) at the previous year end, adjusted for inflation, and relating to all of TPDC’s assets.

- **TEF deficit recovery fund.** This was collected by TPDC and passed to those companies which still had deficits on their TEF (see below).

- **Cross-product subsidy.** As a matter of social/economic policy, prices of LPG, jet/kero and fuel oil are held down. Gasoline and IDO prices are raised to compensate. Almost no effect on gasoil.

- **Petroleum sector rehabilitation fund.** This is regarded as the consumers’ contribution to the World Bank-funded project. (A similar fund was subsequently added to form an escrow account related to the Songo Songo project.)

**Wholesale Price at Dar Es Salaam**

This is the TPDC selling price plus oil company costs, oil company margins, taxes, and duties. Oil company costs and margin are calculated in the same manner as TPDC costs and margin (see above).
Retail Price

This is the Dar Es Salaam wholesale price plus delivery charge and dealers’ margin. The delivery charge for any locality is based on standard mileage costs for asphalt and clay roads as advised by the Transport Ministry, and railway tariffs. Where rail transport is available, the delivery charge assumes that 50 percent of product travels by rail. The distributors’ margin is settled by negotiation with the distributors.

Inflation Adjustment

The maximum price formula as introduced in 1990 contains three separate adjustments for inflation:

1. The return on investment element of the formula allows a 40 percent pretax return on industry assets increased by the previous year’s inflation.
2. The operating cost recovery element allows recovery of the previous year’s operating costs increased by 75 percent of the previous year’s inflation. The reasoning behind this adjustment is that industry operating costs are on average 75 percent variable, 25 percent fixed, and that only the variable component changes with inflation.
3. A “cushion” is intended to protect the marketing companies against sharp unforeseen cost increases. This is equal to half of the permitted level of operating cost recovery, as specified above, multiplied by half the expected inflation rate for the current year.

The formula is normally calculated on September 1 each year, and it is intended that the new prices should apply for a year. This means that the inflation adjustment incorporated in prices that apply during the period September 1993 to September 1994 would depend mainly on inflation during 1992. There is provision for recalculation of the cushion element of the formula in March, to take account of actual inflation (i.e., 1993 inflation in the example quoted).

In practice, the cushion element is no longer included in the formula. The oil companies do not seem to be concerned at this. Possibly they felt that a 40 percent return was adequate compensation for the risks that the cushion is meant to offset. (Companies subsequently changed their views on this issue after prolonged nonimplementation of the formula.)

The Decisionmaking Process

The semi-annual review referred to above is intended to cover only changes in operating costs and the industry’s asset base. There is no timetable for review of changes in product prices and exchange rates, but the industry may request force majeure reviews at any time. These may consider any changes—for example, distributor margins were increased by a review that took effect on March 9, 1994. TPDC bears the burden of slow adjustment for import prices, and as a state-owned entity it is difficult for it to press for a change in the promptness of adjustment.

Whatever the reason for the review, a new price set is calculated by the TPDC and then submitted to the Ministry of Energy and Minerals for approval.
The Ministry may request changes or ask the TPDC to consider alternative assumptions. Other Ministries may be involved in the approval process; in practice the decision is taken in Cabinet.4

The process may take a long time. A review initiated in June 1993 resulted in price changes taking effect in October.

The Transport Equalization Fund

The one significant change that has been made since 1990 was the abolition of the TEF in June 1993. Before that date it had been government policy to set retail prices of oil products at the same level at all regional centers. Up-country sales were subsidized by a levy on sales in and around Dar Es Salaam. The TEF system was operated by the oil companies, which set up a system of transfers so that companies with a higher-than-average proportion of up-country sales received payments from companies with sales concentrated around Dar Es Salaam.

The problem that eventually led to the abandonment of the TEF arose when up-country distributors took delivery of product at Dar Es Salaam. The marketing company making the supply would invoice the distributor for the normal price less the subsidy appropriate to the region where the distributor intended to sell the product. An unscrupulous dealer could then sell the product in Dar Es Salaam and pocket the subsidy. In a survey made in April 1992, the TPDC found that the number of trucks loaded in Dar Es Salaam for certain up-country destinations was more than double the number actually making deliveries at those destinations. The system had no incentive for the marketing company making the sale to check on the destination of the product. The TEF built up a TSh 3 billion deficit, and was eventually abandoned in favor of a system that set prices up-country higher than prices in Dar Es Salaam to allow for the transport cost differential.

Visit Details

The consultant visited Dar Es Salaam from March 23–25, 1994, and met with the following:

**Ministry of Energy and Minerals**
- Mr. P. Victus, Assistant Commissioner for Petroleum

**Tanzania Petroleum Development Corporation**
- Mr. Y. Killagane, Managing Director
- Mr. T. Masili, then Director of Research and Corporate Services

**BP Tanzania**
- Mr. T. Pollard, Finance Manager
- Mr. G. Crouch, Supplies and Trading Manager

**Agip Tanzania**
- Mr. E. Amici, Managing Director

4. Changes in 1997 have led to a much more automatic system.
Total Tanzania

Mr. J. Kisaka, Marketing Manager
Mr. R. Nkanda, Supplies and Distribution Manager.

Bulk Oil/YDK Holdings

Mr. Y. Kotak, Chairman.
Mr. R. Hainsworth, Chief Executive.
Annex 4: Zambia

Description of Industry

The Ministry of Energy and Water Development is responsible for overall energy policy.

Lines of responsibility within Zambia’s very large public sector are not entirely clear. They are in any case likely to change, and some parts of the sector are likely to be privatized. In practice, the Zambian National Oil Company (ZNOC) is responsible for the oil marketing subsector, including petroleum pricing.

The Indeni refinery at Ndola—a simple hydroskimmer—is owned 50/50 by Agip and the Zambian government. It is operated by Agip under a service agreement. Its capacity when running the mix of crude and light products currently employed is about 750,000 tpa, though actual throughput in recent years has been between 600,000 and 650,000 tpa. Zambian products demand was about 560,000 tonnes in 1990.

Up to 75,000 tpa of products from Ndola are exported to neighboring countries—mainly the Shaba region of Zaire. This amount cannot be increased as long as supplies are from Indeni.

Product is made available to the marketing companies at the depot next to the Indeni refinery. All other terminal facilities in the country are owned by the marketing companies.

Five international oil marketing companies operate in Zambia. BP Zambia and Agip Zambia are both owned 50/50 by the government and the respective overseas parent company. They are the largest oil marketing companies operating in Zambia, with market shares of 53 percent and 22 percent, respectively. The other international marketers are Caltex, Total, and Mobil, each of which has a market share of between 7 and 10 percent. (Caltex operations are in the process of being sold.) Shares of the retail market are somewhat different: BP has 46 percent; Agip has only 6 percent, and the others have between 14 and 19 percent each. The three local companies have a negligible share.

Supply Economics

In 1965, Zambia’s southern neighbor, Rhodesia (now Zimbabwe) declared its independence, and the international community imposed sanctions. The Zambia/Rhodesia border was closed, shutting off Zambia’s principal petroleum supply route. After a period of severe shortage, an alternative route—the Tazama oil products pipeline from Dar Es Salaam—opened in 1968. In 1973, the Indeni refinery opened at Ndola, and the pipeline was converted to carry crude oil.

The unique features of Zambia’s system of petroleum supply follow from that bit of history; from the country’s geographical situation—it is completely landlocked, and its capital, Lusaka, is 520 miles from the sea—and from the nature of its economy. Until
recently, Zambian industry was almost entirely state owned—the country had adopted a command economy.

The economics of Zambia’s oil supply route depend crucially on the ability of the country’s economy to absorb the refinery’s output of fuel oil. Under command economy conditions, the mining sector—100 percent state owned—has been induced to rely on fuel oil rather than gasoil or indigenous coal. By running a carefully calculated blend of crude oil (Arab Medium) spiked with condensate, gasoil, and DPK it is possible to balance the output barrel to demand. The balance is precarious, however, and it may be unsustainable in a more flexible liberalized economy.

Alternative supply routes are numerous. The main possibilities are as follows:

- **Conversion of the Tazama pipeline to carry products, combined with closure of the refinery.** A recent World Bank study recommended that this course should eventually be adopted.

- **South Africa’s large, efficient, and expanding refineries can supply product into southern Zambia using a number of routes.** The most competitive is probably via Beira, in Mozambique. The product pipeline from Beira to Mutare, in Zimbabwe, is being extended to Harare, which is 300 miles by road from Lusaka. Two other routes for South African product are possibly economic, at least for supply into some regions of Zambia. One is via the Zimbabwean railway system to Livingstone, in the Southwest of Zambia; another possibility is through Malawi. The economics of supply via the last-named country are likely to be considerably improved by the renovation of the railway from Nacala, in Mozambique, now almost completed.

- **The Tazara railway from Dar Es Salaam.** Heavy investment would be needed to make this a feasible supply route for more than a small part of Zambia’s product requirements.

  During a lengthy maintenance shutdown of the refinery in 1993, imports came by rail from South Africa (via Zimbabwe) and Dar Es Salaam.

**Price Regulation**

The current system was adopted in June 1993 as an integral part of the Petroleum Sector Rehabilitation Project sponsored by the World Bank. Its basis is the set of prices at which ZNOC sells to the oil marketing companies at Ndola depot. Retail prices in the different regions of Zambia are calculated as the sum of the wholesale price at Ndola, an allowance for transport cost, and a distributors’ margin. The method of calculating retail prices needs to be changed—it is the subject of an ongoing consultancy study—and this stage of the price calculation is not described further in this report.

The wholesale price at the depot at Ndola is essentially an import parity price calculated as if the Indeni Refinery did not exist. The calculation is made in three stages, each of which is described in detail below. In summary:

- The actual replacement cost of current supplies at the refinery depot is calculated.
• Import parity prices for all products are calculated as if the refinery were shut down (i.e., white products are assumed to be supplied via the Tazama pipeline; black products and LPG by rail).

• The difference across the barrel between actual replacement cost and import parity assuming refinery shutdown is the apparent refining margin. This benefit is allocated to LPG and black products by reducing their calculated import parity prices. The Jet A1 price was reduced in a similar manner in order to match prices in Zimbabwe.

In fact it is erroneous to regard this calculated refinery margin as the real benefit to the Zambian economy of operating the Indeni refinery. It arises largely from the high cost of importing fuel oil by rail—the method assumed in the import parity calculation. However, in the absence of the Indeni Refinery, it is unlikely that fuel oil would be imported into Zambia, as the mines—the sole consumer—would convert to either diesel or coal.

Calculation of Replacement Cost—Commingled Products

Actual landed cost of product at the Ndola depot is calculated, starting from actual invoiced supply costs of Arab Medium crude, Margham condensate, DPK, and gasoil. The invoice prices used are those that applied 45 days before the date of the calculation, as this is the approximate process time between crude unloading date and refinery terminal.

To the CIF Dar Es Salaam feedstock cost are added the following:

• Importer’s margin (5 percent of cost into pipeline).

• Standard or budget figures for pipeline, refinery, and other supply related costs, including finance charges. (The refinery and pipeline are operating on performance contracts and have negotiated dollar-based prices.)

Calculation of Import Parity Prices

The second stage of the price calculation is to assess what would be the cost of product imports if the refinery were closed down. The calculation is made for each product separately assuming that white products are imported via the Tazama pipeline (i.e., it is assumed that this would be converted to carry products), and that fuel oil, bitumen, and LPG come in by rail from Dar Es Salaam.

The actual calculation is very similar to the replacement cost calculation described above but based on Arab Gulf postings for white and black products current at the time of calculation. Freight charges and budget loss figures are consistent with the alternative supply routes assumed in the calculation.

Wholesale Prices

For white products, wholesale prices are import parity prices converted to Kwacha at an exchange rate forecast for the coming month (i.e., just above the current rate).

For fuel oil, bitumen, and LPG the wholesale price is calculated as follows:
The replacement cost calculation gives the cost at the Ndola depot of products from the refinery. A calculation based on prices current at the end of March 1994 gave a replacement cost across the barrel of $306.41 per tonne.

The import parity calculation gives the cost of the same mix of products, imported directly. At end March 1994, prices this was $327.78 per tonne of refinery feedstock, so the apparent refining margin was $21.37 per tonne.

This is equivalent to $122 per tonne of fuel oil, bitumen, and LPG. At end-March 1994, the wholesale prices for these would be set at import parity minus $122 per tonne.

The Decisionmaking Process

The intention when the new system was implemented was that prices should be calculated monthly by the ZNOC accounts office and the new prices introduced automatically. In practice, price changes are treated as a political decision and are subject to considerable delay—mainly over issues related to the distribution margin, which is not described in detail in this report.

ZNOC management consults with the Ministry before releasing a new set of prices—no other government body is directly involved in the price-setting process.

Visit Details

The consultant visited Lusaka March 28–31, 1994, and met with the following:

Ministry of Energy and Water Development
Mr. R. Sampa, Permanent Secretary

ZNOC
Mr. E. Kasunga, Chief Executive
Mr. J. Soko, Chief Accountant

BP Zambia
Mr. P. Knoedel, Managing Director

Agip Zambia
Mr. C. Ferrari, Managing Director

Caltex Oil Zambia
Mr. A. Rutherford, Resident Director

Mobil Oil Zambia
Mr. J. Cornfeld, Managing Director
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