Examining the social and economic benefits the African refining industry contributes to nations compared to import terminal operations, and implications of Govt policy

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African Refining

1. Global S&D Balance, Price & Refining

2. The African Refining Landscape

3. The Refining Investment Landscape

4. Woodmac Study on African Refineries

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GLOBAL S&D BALANCE, PRICE & REFINING SCENARIOS

IMPACT OF US TIGHT OILS, DECLINING DEMAND IN EUROPE, NEW REFINING CAPACITIES: OIL PRODUCTS MARKET IS LONG

For 2014 EU throughput was lower than 2013

For 2014 USA throughput is same as in 2013

Disaster struck after June 19, 2014 when crude dropped from $115 to average 80/bbl today.
1. There are 54 countries in Africa. Africa produces 8.1 MMBD of oil (10% of global production). Consume 3.8% of global demand. Has 3.5% of global refining capacity (3.4 MMBD which operates @ 70% at a time.

2. In total, 57 refineries have been built in Africa, 43 are currently operational, 22 of which are in SSA and 21 in North Africa; 14 have been permanently closed.

3. Many have operated irregularly in recent years; this is particularly true for refineries in Nigeria, Kenya, Ghana & Senegal.

4. African slate (see below) Diesel > Gasoline. However, in Transportation fuels, Gasoline > Diesel owing to Nigeria & RSA.

5. 1.9 mn b/d capacity is in North Africa and 1.5 mn b/d in SSA (779,000 b/d in WCA and 725,000 b/d in ESA – excluding the two synfuels refineries in RSA with combined capacity of 205 MBD.

5. Upgrading capacity (expressed as catalytic cracking equivalence as % of CDU) is very low: only 9.5% in North Africa, 19.4% in WCA and 27.2% in ESA.

6. Challenges for African refineries:
   - Low complexity
   - Logistical constraints
   - Sub-optimal local market size
   - Deregulation and privatization pressures
   - Tightening product specifications
   - Lack of investment/project finance
   - Competition from other regions

Africa consumption is 3.6 mn b/d (Vitol Mar. 2013).
Therefore, Africa should be a net importer of 200,000 b/d. However, Africa imports about 1.4 mn b/d ‘cause actual refining production is 2.2 mn b/d.

Sources: CITAC/ARA Database
THE AFRICAN REFINING LANDSCAPE

REFINING PROJECTS STILL TO MATERIALIZE...A NUMBER WHICH ARE INTEGRATED...AND NOC LED

- Coega versus Lobito competition still hot
- Impact of Coega on local refineries...
- ... combined with clean fuel investments...
- ... would “kill” a number of refineries in South Africa

- Future of Indeni increasingly fragile...
- ... while SAR has found a new shareholder
- Big changes expected in Eastern Africa
  - Uganda versus Kenya; Future of KPRL?
- Changes in Western Africa are also expected
  - Greenfield projects
  - Upgrades – SONARA, TOR

- New investors required
  - Majors exit refining, esp. in Africa
  - China, India are increasingly present

Main Possible / Realistic Changes in Sub-Saharan Refining Landscape

Source: PFC Energy / IHS – Downstream Africa Service

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• If every known refinery project was completed, the gap would only halve by 2025
Refining is a capital intensive industry:
- $10 billion capex for 400,000bpd
- $1.2 billion to hold one month’s stock
- plus on-going maintenance capital

With highly volatile margins

Global Semi-Complex Refining Margins

Source: IEA
African Refinery Benefits Study

• In this environment the ARA Executive Committee launched a study, IN 2012, to research the benefits of an African refining presence when capital funds are hard to justify, and when many projects are competing for shareholders’ and governments’ funds: to attempt to value the ‘socio’ of socio-economic benefits

• The objective of the study being to measure the DIRECT and INDIRECT benefits of retaining a refining industry for country and regional economies. This measurement can then be used to assess the degree to which any government support for a refinery is justifiable

• After a competitive tender, the study was awarded to Wood Mackenzie
Our assumption throughout is that markets and/or governments will ultimately find a way to meet the nation’s energy needs via imports in the event that current indigenous refining capacity becomes unavailable. We believe that African nations’ alternatives to indigenous refining capacity will be to increase the volume of refined fuel imports from international markets. This would necessarily be facilitated by additional import terminal facilities.
Strengthening the cash-generating position of African refineries would yield considerable benefits for all.

Support from governments

Ability to invest in clean fuels

Stronger economy enhances multiplier effects

Ability to invest in stronger margins

More wealth creation

More job creation

Government Support to Kick-Start Refinery and Economic Development
Difficult where Govt is encouraging competitiveness

In RSA, the Competition Law and Regulatory regimes encourages unhindered competition, free & equal access, appropriate allocation of scarce national resources, etc.

Therefore, “subsidies” or “protection” in any form are an anathema. Is this realistic – given the indirect support the Jamnagers of this world receive from their Govts?

A viable solution is a regional (e.g. SADC, ECOWAS or COMESA) refining hub approach heavily funded by Govts but allowed to operate as a “Corporate entity”. Alternatively, protect the Dangotes of Africa from saboteurs of refining in order for them to build & operate privately-owned 400,000 b/d type mega-refineries.
The case for Beneficiation

We find that even weaker refineries can provide a positive contribution to local economies.

Even cash negative refineries can add value to their economy via the indirect and induced effects.
History of re-investments has been a challenge

Although only those refineries with a history of investment give higher economic benefit than importing fuels

Added Value to Local Economies – Refineries Net of Import Terminal

- Weak Refinery, less developed
- Strong Refinery, less developed
- Weak Refinery, more developed
- Strong Refinery, more developed

But netting off GVA contribution from import terminal shows weak refineries can be a net burden
Health Benefits

Contrast with the Australian & Kenyan Refining Scenarios

Tightening environmental legislation would bring considerable benefits, but mandated investment could risk refinery closures

$6bn of investment in African refineries to improve environmental performance would result in $43bn of health savings to African nations over a 10 year period

Extract from “Refinery and Health Study for Sub-Saharan Africa (SSA)”, World Bank, 2009

The Aussie Govt legislated for Cleans Fuels in 2006 and refiners fully implemented (with BP meeting Euro 5 levels two yrs before deadline). Exactly 8 yrs later, these refineries are closing because of uncompetitiveness from mega-refineries in Asia and Middle East.

The Caltex 235,000 b/d Kurnell refinery in Brisbane closed last month.

KPRL, one of the founding members of ARA, came to an unannounced closure in Sept 2014, because of uncompetitiveness from mega-refineries in Asia and Middle East. Ironically, the closure coincided with first Jet cargo import from the new SATORP mega-refinery in Jubail (Saudi Arabia).
SUMMARY FINDINGS

Import terminals are typically far simpler operations than the corresponding refining alternative, requiring few staff to operate and limited interaction with other national industries. In contrast, African refineries typically employ many hundreds of often highly-educated, highly-skilled staff, and form an integral part of their local economies and societies via their need for supporting goods and services and their involvement in local community initiatives.

African refineries provide considerable social benefits to their host nations

This study has found that African refineries contribute significant social benefits when compared with their host nation’s alternative of greater import terminal operations. In particular, we have found that African refineries:

- *Reduce environmental emissions* by providing higher quality fuels than those which are imported in many cases, and also by avoiding unnecessary CO₂ emissions from seaborne transit of crude exports and refined product imports;

- *Provide skilled employment opportunities* by providing 500-100 more graduate/highly skilled roles than a similar capacity fuels import terminal, maximising opportunities for educated local people to work within their home nation and limiting the risk of ‘brain-drain’ to other countries with better employment prospects;

- *Contribute to transparent business practises* by supplying the nation’s fuels needs from a single source which is more readily regulated than fuels imports which typically require numerous changes of title with complex paper-trails before reaching consumers;

- *Contribute to their host nation's social stability* most notably in the less developed African nations where fuels self-sufficiency may be seen as important from an international political perspective and job creation and influence on the local economy makes refineries important to regional politics;

- *Provide short-term security of supply* since imports of crude oil (where required) are less susceptible than imports of refined product to supply interruptions from piracy, unfavourable marine conditions and trade embargos.

We have found that the social benefits of African refineries summarised above are universally apparent. We have found that whilst the impact of these is perhaps most important in the less developed nations, even the most developed nations benefit through provision of skilled employment opportunities and improved security of supply.
African refineries also provide a range of economic benefits to their host nations

This study has also found that African refineries make a significant contribution to their host nation’s economies when compared with alternative supply of refined products via greater import terminal operations. In particular, we have found that African refineries:

- **Create significant employment for local communities** with up to 10,000 jobs being attributable to a local refining presence in some countries.

- **Increase tax revenues for the host government** via a variety of sources including incremental income taxes due to higher employment levels than a corresponding import terminal, additional taxes from related support industries and export duties on surplus refinery production (typically naphtha and fuel oil).

- **Support value chain integration** by enabling direct linkage with upstream oil production (where available) and providing a platform for manufacturing of non-fuels to either support or develop a broader industrial base in the construction, manufacturing and clothing industries.

- **De-risk the host nation’s economies** by providing a degree of diversification away from dependence on international oil and other commodity prices.

We have found that all African refineries benefit their host nation through the economic benefits listed above. The materiality of these varies by nation, with the weaker, less diversified economies benefiting most from higher tax revenues and also having the most to gain from potential value-chain integration. Conversely, the more developed economies tend to already benefit from the synergies afforded by value-chain integration and so may have more to lose if the future of their refining industries becomes threatened.
SUMMARY FINDINGS

One of the most tangible economic benefits found is the creation of **significant employment opportunities** linked to a refining presence. Our assessment of the job creation associated with refining necessarily considers not just those people working directly for the refinery (in either staff or contract roles), but also those in employed in **indirect and induced** job functions as illustrated in Figure 2 below:

**Figure 2: Introducing the Concept of Employment Multiples**

- An oil refinery supports job creation through three channels:
  - Firstly, the refinery employs people directly to run the refinery.
  - The operation of the refinery requires inputs from other industries, which also creates employment. This is called indirect employment.
  - Finally, both the direct and indirect employees spend their wages, supporting other businesses. This is called induced employment.

Source: Wood Mackenzie
SUMMARY FINDINGS

Even challenged refineries can provide a positive contribution to local economies

We have also assessed the contribution to host nation’s economies as measured by the gross value added (GVA) approach. Broadly speaking, GVA is the value of goods produced less the cost of intermediate goods consumed:

**Figure 3: Measuring Cross Value Added**

**Net Cash Margin (NCM, $/bbl)** – Estimated based on the NCM of the 4 indicator refineries. It is worth noting that the NCM we used is net of any Government subsidies.

**Refineries Utilisation Rates (%)** – Estimated based on the utilisation rates of the indicator refineries in each refinery case.

**Refinery Capacities (bbl/d)** – Estimated based on the capacities of the indicator refineries plotted in each refinery case.

**Refinery Salaries (p.a.)** – Estimated based on the salary benchmarks of the indicator refineries plotted in each refinery case.

**Number of Refinery Employees per Refinery** – Estimated based on indicator refinery employees numbers of the refineries plotted in each refinery case.

Source: Wood Mackenzie
SUMMARY FINDINGS

Only refineries with a history of investment give higher economic benefits than importing fuels

However, in order to provide a fair assessment of the benefits of refining in Africa, our work necessarily also considers the host nation’s alternative of increased presence of fuels import facilities. Our analysis finds that the economic benefit of fuels import facilities is limited. This is because an import terminal’s lower employment numbers and limited need for support industries result in a much lower multiplier effect on local economies.

Whilst the economic benefits of fuels import terminal are limited, they are however greater than those provided by some of the more challenged African refineries. The implication of this is that some nations with challenged refining operations would gain more economic benefit from refinery closures and investment in import terminals. The granularity of our analysis in this study is insufficient to identify specific situations where this is the case. It should also be noted that refinery closures would result in the loss of the significant social benefits highlighted by this study.

Conversely, those nations with a strong refining presence gain significantly more economic benefit from sustained refining operations than they would from increased fuels imports. Again, this study does not consider African nations in sufficient granularity to identify specific situations where this is the case. However, our work does enable us to observe that refineries with a history of investment in high quality process facilities, in regular maintenance and in human capital tend to be those which add most value to their nation’s economies.
Tightening environmental legislation would bring considerable health benefits

Many African refineries are operating to more lenient environmental standards than their counterparts in other continents. This applies to both to the allowable level of refinery-based emissions (e.g. NOx, SOx, VOCs) and to the quality of fuels produced and the associated emissions from vehicles and other consumers.

The health benefits of cleaner fuels and reduced refinery-based emissions are significant. The “Refinery and Health Study for Sub-Saharan Africa (SSA)” published by the World Bank in 2009 identified that $6bn of investment in African refineries to improve environmental performance would result in $43bn of health savings to African nations over a 10 year period.

The health benefits of cleaner fuels could be accompanied by broader economic benefits also. For example, the motor manufacturing industry in South Africa currently produces vehicles which are capable of running on lower quality fuels than those produced elsewhere by the industry’s international owners. The drive for greater operational synergies and efficiencies in the global motor industry may render this situation unsustainable.
SUMMARY FINDINGS

Mandated environmental investment risks losing the socioeconomic benefits of refining

Governments in Africa are facing a fundamental choice with respect to tightening environmental legislation:

- Supply of clean fuels with from indigenous refineries with reduced emissions;
- Closure of indigenous refineries and importation of clean fuels from international markets.

In the first option, the investment required is typically very significant and may exceed $500M in some specific situations. Experience of clean fuels programs in Europe and elsewhere suggests that refiners are unlikely to receive a commercial return on any such investment. Product prices for higher quality fuels tend to command only a modest market premium over the poorer quality alternative. As such, we consider that African refiners are extremely unlikely to invest in improved environmental performance unless mandated to do so. But even then, many will not have access to sufficient funds (either capital or commercial debt) to comply and so may be forced to close. Indeed our own analysis of African refinery earnings suggest very few indeed generate sufficient cash-flow to invest in such major capital projects – especially an environmental investment with little hope of generating a commercial rate of return.

This then leads us to the second option where host nations accept refinery closures and instead become increasingly reliant on fuels imports. Whilst technically feasible for almost all nations, the resultant loss of the social and economic benefits of refining which have been identified by this study are unlikely to be welcomed.

Nevertheless, the health benefits of improved environmental performance are irrefutable and the World Bank study expects this to translate into material economic benefits. The fundamental issue is that those Africa refiners who invest in environmental improvements are not the beneficiaries of the identified economic benefits.

This leads us to conclude that government support to refining investments may provide the only ‘win-win’ solution.
SUMMARY FINDINGS

Government support may represent an attractive solution for host nations

This study has evaluated a range of policy levers which may be available to host governments to support their nation’s refineries. These may be considered by governments as a means to access the identified health benefits whilst retaining the identified socioeconomic benefits of indigenous refining.

The policy levers considered fall into 3 categories:

- **Margin support:** Any type of monetary support given to refineries which improves their profitability, which typically takes the form of advantageous import duty arrangements or product price premiums;
- **Human capital investment:** Investment in the people who run the refinery to improve refinery operational performance;
- **Financial support:** Financial support either via provision of debt or equity, investment tax breaks or by underwriting commercial debt.

Our analysis indicates that all identified forms of government support would increase the provision of socioeconomic benefits from indigenous refineries. The more challenged African refineries show the most potential to deliver more value to their host nations. Importantly, it is these same refineries which are characterised by historic levels of under-investment and are hence least able to comply with government environmental improvement initiatives such as clean fuels policies.

Provision of support to refineries may represent an attractive solution for governments. This may enable environmental aspirations to be achieved whilst ensuring sustained socioeconomic value contribution from indigenous refineries. The economic benefits of clean fuels as identified by the World Bank study may provide ample return to governments for their support to local refineries.

We conclude that policy decisions around future fuel supply and quality should be taken by governments in conjunction with their indigenous refineries with the aim of finding a commercially attractive solution for all parties.
Value of African Refining

- A full presentation of the study is available on the ARA website:

Introduction to the ARA

• The African Refiners Association was founded in Cape Town in 2006

• A not-for-profit Association, working on behalf of its members

• Represents the pan-African downstream oil industry

• A platform for debate and policy foundations for all downstream players – not just refiners
Introduction to the ARA

- The ARA promotes exchange of experience and best practice between all downstream stakeholders, with anti-trust provisions.

- The ARA strives to improve communication and cooperation between its Members and the international oil market.

- The ARA cooperates with relevant industry groups, governments, regulatory bodies, international agencies, International Financial Institutions, academic institutions and other NGOs.
Introduction to the ARA

- 37 of the 42 African operating oil refineries are members
- New refineries in Chad & Niger are expected to join and have already attended ARA meetings
- 47 non-refining companies (i.e. importers, terminal operators, government regulators, major marketers, shippers) are Associate Members
Introduction to the ARA

“...from 60 to 600 AGM delegates”

2006 AGM
Cape Town

A real need for a trade body to represent the pan-African oil Downstream industry

2014 AGM
Marrakech
The ARA Work Groups enable sharing of good practice across the African downstream sector.

- Biofuels Policy
- AFRI specifications
- World Bank Refining & Health Study 2010
- ARA Value of Refining Study 2014
- Ship vetting review

Introduction to the ARA
Introduction to the ARA

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- Share experiences with pan-African and international companies

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Source: www.afrra.org
Conclusions

- **Refining**: in dire need of investment finance to upgrade and improve product quality

- **Port infrastructure, storage and secondary distribution (roads & transport)**: a vital role in the future of Africa’s safe and efficient energy supply for all stakeholders

- **The choice** between these importing or refining options should be based on economic grounds, including the socio-economic benefits of refining: essentially, job creation
Thank you for your attention!

Any questions?