

# Products Specifications – ARDA Clean Fuels Roadmap and Updates on Regional Initiatives (ECOWAS and African Union Commission)

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**Nigerian Petroleum Downstream Industry and  
ARDA Virtual Workshop**  
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African Refiners & Distributors Association  
جمعية المكررين والمسوقين الأفارقة  
Association des Raffineurs & des  
Distributeurs Africains

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The voice of african downstream oil  
La voix de l'aval pétrolier africain  
صوت مصب النفط الأفريقي

# Introduction to ARA / ARDA

- ARA = African Refiners and Distributors Association ([www.afrra.org](http://www.afrra.org))
- Created in 2006; name changed in 2017 to reflect complete supply chain
- Acronym and logo changed from “ARA” to “ARDA” in October 2020
- **Role of the ARDA:**
  - Give unified voice to **African refiners** and independent **marketers, distributors** and **regulators**
  - Promote exchange of experience and best practices amongst all stakeholders
  - Champion efforts for investments across African Downstream supply chain
  - **Promote African Energy Security** – Maximize processing of African crude oil in African Refineries and transportation of cleaner fuels via integrated African Storage & Distribution infrastructure across the continent



# ARDA Work Groups – Staffing

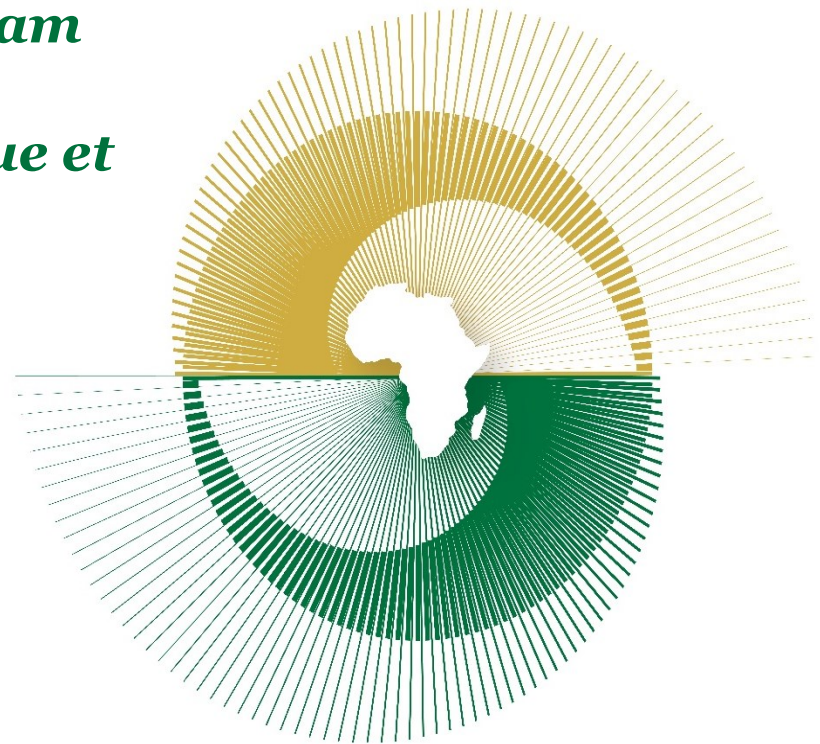
Work Group	WG Leader		WG Deputy Leader		Secretary
	Name	Company	Name	Company	
<b>Refining &amp; Specifications</b>	<b>Daouda Kebe</b>	<b>SAR (Senegal)</b>	<b>Evans Mauta</b>	<b>Indeni (Zambia)</b>	<b>Georges Baou</b>
<b>Storage &amp; Distribution</b>	Hippolyte Bassole	SONABHY (B. Faso)	Martin Wanyama	KPC (Kenya)	Jacques Cardeau
<b>Regulation</b>	Esther Anku	NPA (Ghana)	Lidia Ikapi-Neyer	SOGARA (Gabon)	Jacques Cardeau
<b>HSEQ</b>	Evans Mauta	Indeni (Zambia)	Armand Atte	SIR (Cote d'Ivoire)	Georges Baou
<b>Human Capital</b>	Bintou Kamara	PETROCI (Cote d'Ivoire)	Jessica Akintade	Sahara (Nigeria)	Huguette Doh
<b>LPG</b>	Emmanuel Omuojine	Rainoil (Nigeria)	Siriki Bamba	PETROCI (Cote d'Ivoire)	J.Marie Dervain
<b>Sustainable Financing</b>	Anibor Kragha	ARDA	Reginald Crawford	Gemcorp (Angola, Liberia)	Huguette Doh

# ARDA WEEK 2023 – 13 to 17 March, 2023

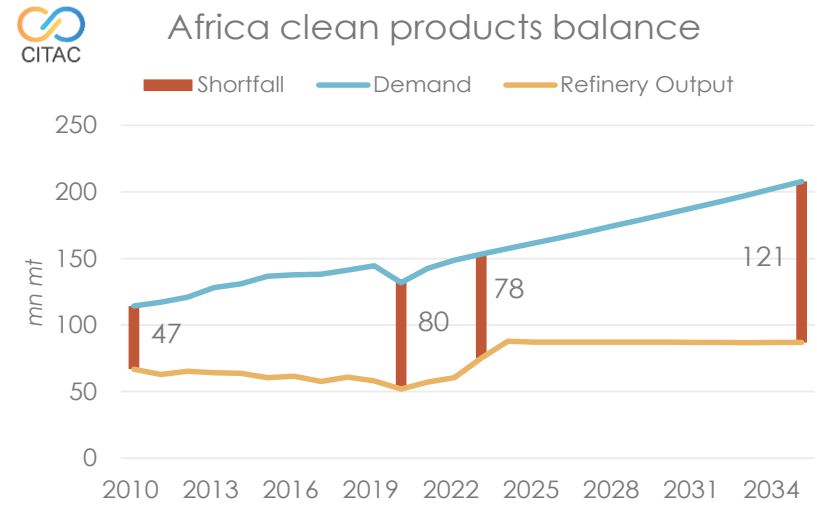
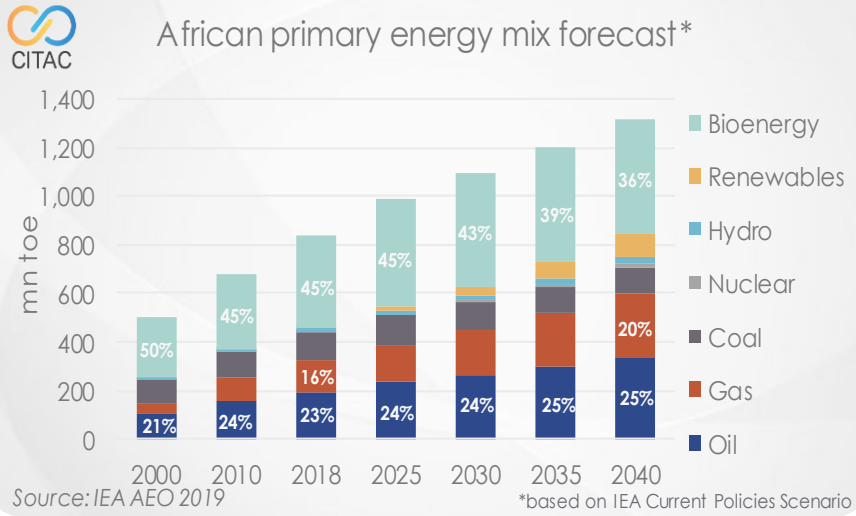
## *Balancing Energy Transition and Security for the African Downstream*

## *Equilibrer la transition énergétique et la sécurité pour l'Aval Africain*

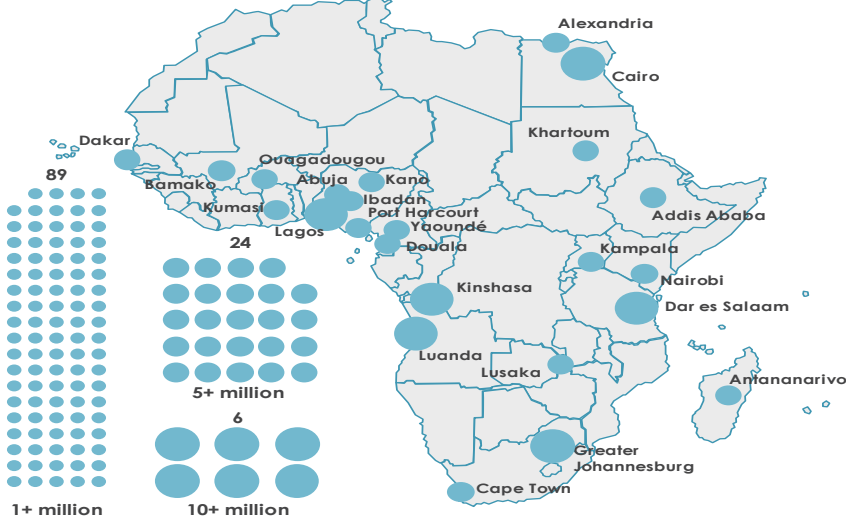
- VENUE: Century City Conference Centre (CCCC), Cape Town, South Africa
- Contact: [info@afrra.org](mailto:info@afrra.org) for more information



# Africa's Growing Petroleum Products Demand must be met with Cleaner Fuels



## African Cities by population – 2035



- Fossil fuels demand and products imports to grow over next two decades
- Major urban population growth to result in increased pollution
- Sustainable transition to cleaner fuels imperative to address public health issues

# AFRI Clean Fuels Roadmap – Historical Perspective

- **Key objective – promote intra-regional trade**
- Development of Roadmap driven by lack of harmonised regulations for fuel specs
- First version of Roadmap in 2007; max target of AFRI-4 (with limited parameters)
  - Initial implementation targets proposed – AFRI-2 by 2010 & AFRI-4 by 2020
- **AFRI-5 and AFRI-6 added over time; current targets are:**
  - **ECOWAS: AFRI-5 by 2025**
  - **African Union: AFRI-6 by 2030**
- Vehicle Maintenance and Mandatory Inspection & Controls are essential alongside fuel quality improvements to reduce air pollution and ensure cleaner air

SPECIFICATION	GASOLINE	GASOIL
AFRI-2	500 ppm	3500 ppm
AFRI-3	300 ppm	500 ppm
AFRI-4	150 ppm	50 ppm
<b>AFRI-5</b>	<b>50 ppm</b>	<b>50 ppm</b>
<b>AFRI-6</b>	<b>10 ppm</b>	<b>10 ppm</b>

# ARDA leading Specs Harmonisation Drive



## ARDA/AUC study on adoption of AFRI Road Map

- Benefits of cleaner harmonised specs presented in Phase 1
- Stakeholder Validation Workshop held in Dec. 2019
- AUC-STC recommended AFRI Roadmap at Dec. 2020 STC Meeting
- Phase 2 estimated US\$15.7 Billion cost of upgrading refineries to produce cleaner, AFRI-6 (10 ppm sulphur) specs
- Proposed specs are AFRI-5 (50 ppm sulphur) by 2025 and AFRI-6 by 2030



## ECOWAS study on harmonising fuel specs

- Study recommended max 50ppm imports from 1 January 2021, with refinery waivers until end 2024.
- 5-7 Feb 2020 meeting of Oil and Environment Ministers adopted study
- Directive issued in September 2020.
- Implementation now progressing in various countries





# Key Initiative – AU Adoption of ARDA AFRI Clean Fuels Policy



## AIR QUALITY

- ARDA and African Union (AU) collaborating on adoption of ARDA AFRI Clean Fuel Specifications across Africa
  - Target is pan-African standards for fuel specifications
  - Actions to implement AFRI 6 by 2030 (10ppm sulphur)
  - Covers health & socio-economic & benefits of cleaner fuels
  - **Critical Success Factor: Securing sustainable project financing to upgrade African refineries to produce cleaner fuels to meet growing demand**
- Encourages implementation of above with required regulatory framework for both fuels and vehicles
  - Fuel and Vehicles are integrated system for “Cleaner Air”

**ARDA Policy on African Gasoline & Diesel Specifications**





# Process for Adoption of AFRI Fuels Roadmap by African Union Commission (AUC) almost completed



**2019**

**November 2019:**  
Draft Phase 1 report submitted to AUC

**May 2019:**  
Project kick-off meeting with AUC in Addis Ababa

**December 2019:**  
Stakeholders' meeting in Addis Ababa to discuss the draft report

**2020**

**June, July 2020:**  
AUC and ARDA held three online forums to discuss AFRI Clean Fuels Roadmap

**November-December 2020:**  
Draft findings from Phase 2 presented to the Specialised Technical sub-Committee of African Ministers

**2021**

**February 2021:**  
Second revision of Phase 2 report submitted to AUC

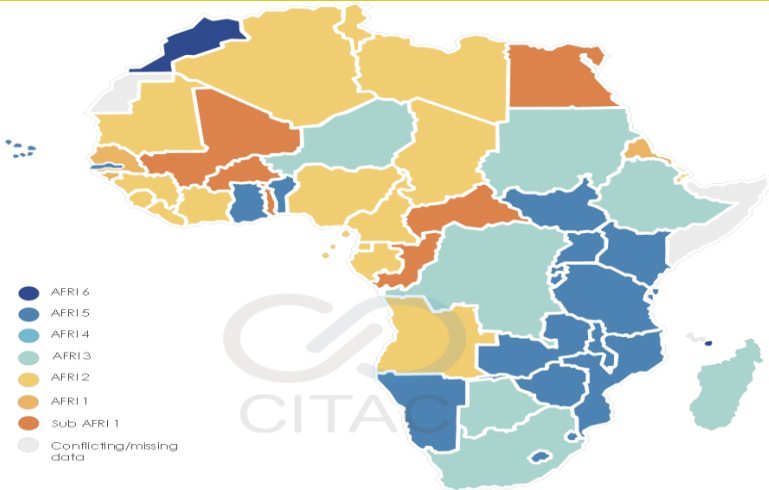
**April 2021:**  
Final report submitted to AUC

**June 2021\*\*:**  
Final report to be presented to Specialised Technical Committee (STC) of African Union Commission

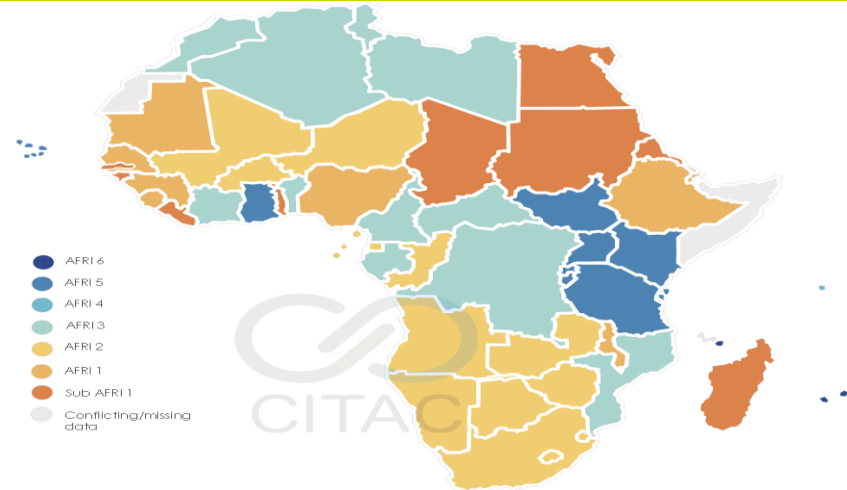
## • Two more steps required for process to be completed:

1. Endorsement of AFRI Roadmap by AUC-STC (planned for June 2021)
2. Final approval by AUC Permanent Representative Council (PRC)

# Sulphur Compliance – AFRI vs. Official Specs



Source: CITAC



GASOIL/DIESEL	
Specs	Majority of AU States have one specification only <u>Exceptions:</u> S. Africa, Botswana, Lesotho, Eswatini
Grades	11 different permissible grades with sulphur content ranging from 10ppm to 10,000ppm

GASOLINE	
Specs	44 of 54 AU States have one specification only <u>Exceptions:</u> Algeria, Egypt, Angola, Ghana, G-Bissau, Senegal, S. Africa, Botswana, Lesotho, Eswatini & Namibia
Grades	12 different permissible grades with sulphur content ranging from 10ppm to 2,500ppm

# ECOWAS making positive strides towards adoption of AFRI Fuel Standards



- ECOWAS most complex downstream environment in Africa
  - 15 Member States – 5 refining nations, 7 export or transit states
  - 7 different sulphur limits for gasoline and gasoil
- High-level Sensitization Missions conducted in 9 Member States
  - Niger, Burkina Faso, Mali, Côte d’Ivoire, Senegal, Benin, Togo, Gambia, Ghana
- National authorities aware of issues and need to implement ECOWAS Directive on harmonization of automotive fuels (gasoline and diesel) in the sub-region
- Several countries have initiated actions that should lead to national transposition of the Directive
- Several constraints highlighted in implementation of the Directive, particularly:
  - Adequacy of storage and logistics infrastructures
  - Certification and quality control
  - Price implication impact
  - Financing required to upgrade refineries to produce cleaner fuels

# ECOWAS Adoption of AFRI Fuel Standards – Current Implementation Status (Sept. 2022)



Compliance with almost all parameters (particularly 50 ppm Sulphur content)	COUNTRY	STATUS
	Ghana	Adopted since 2017
	Benin	Interministerial Act enacted March 2021
	Cape Verde	Aligned May 2021, Official Journal
	The Gambia	National Standard aligned with Directive but not yet gazette

Source: ECOWAS (Sept. 2022)

- Niger, Côte d’Ivoire, Senegal preparing to upgrade refineries for 2025 deadline; B. Faso, Mali, Senegal started consultation(s) to find solutions to challenges
- Nigeria – Section 318 (11) of Petroleum Industry Act (2021) states:
 

*“To safeguard the health of Nigerians, imported petroleum products shall conform to the Afri-5 Specification (50 ppm Sulphur) as per the ECOWAS declaration of February 2020 on adoption of the Afri-Fuels Roadmap or as may be prescribed by regulation.”*

# Effective collaboration essential for successful adoption of AFRI Fuels Roadmap



- In all ECOWAS states, successful implementation of new standards requires support from:
  - Ministry of Environment
  - Ministry of Energy/Petroleum
  - Ministry of Transport
  - Ministry of Trade
  - Ministry of Finance
  - Standards organisations
  - Energy regulators
  - Enforcement authorities: police; customs and excise, trading standards
  - National oil companies
  - Refinery shareholders
- **Such coordination required across various African countries and sub-regions for success**



# Thank You for your Attention



# AFRI Road Map – Gasoline

	Gasoline AFRI specifications						Methods
	AFRI-1	AFRI-2	AFRI-3	AFRI-4	AFRI-5	AFRI-6	
RON, min. <sup>[1]</sup>	91	91	91	91	91	93	ASTM D2699 / IP 237 / EN ISO 5164
MON, min.	81	81	81	81	81	83	ASTM D2700 / IP 236 / EN ISO 5164
Lead content, mg/l, max. <sup>[2]</sup>	Unleaded	Unleaded	Unleaded	Unleaded	0.005	0.005	ASTM D5059 / ASTM D3237 / ASTM D3348 / ASTM D3341 / IP 270 / IP 228 / IP 362 / IP 352 / EN 237
Sulphur content, % mass, max.	0.100	0.050	0.030	0.015	0.005	0.001	ASTM D2622 / ASTM D5453 [3] / IP336 / EN ISO 20846 / EN ISO 20847 / EN ISO 20884 / ASTM D4294
Benzene content, vol%, max.	to be reported	to be reported	5	1	1	1	EN 12177 / EN 238 / ASTM D5580 / ASTM D5443 / ASTM D3606 / ASTM D6730 / ASTM D4815
Aromatics, vol%, max.	n/a	n/a	n/a	n/a	42	35	ASTM D1319 / ASTM D5580 / ASTM D5443 / EN ISO 22854
Density at 15°C, kg/m <sup>3</sup> min-max	n/a	n/a	n/a	n/a	725-780	725-775	ASTM D1298 / ASTM D4052 / IP 160 / IP 365 / EN ISO 3675 / EN ISO 12185
RVP, kPa, max.	n/a	n/a	n/a	n/a	65	65	No alcohol: ASTM D323 / IP 69 / ASTM D5191 / ASTM D4953 / EN 13036-1 With alcohol: ASTM D4953 / EN 13036-1
Ethanol content, vol%, max. <sup>[4]</sup>	10	10	10	10	10	10	EN 1601 / EN 13132 / ASTM D4815 / EN ISO 22854 / EN 14517 / EN 1601 / EN 13132
Manganese content, mg/ltr, max.	n/a	n/a	n/a	n/a	18	6	

1. A higher grade of gasoline may be marketed if required.
2. “Unleaded” means <0.013g of lead per litre.
3. In case of dispute test method ASTM D5453 shall be used.
4. Imported gasoline to be free from oxygenates.

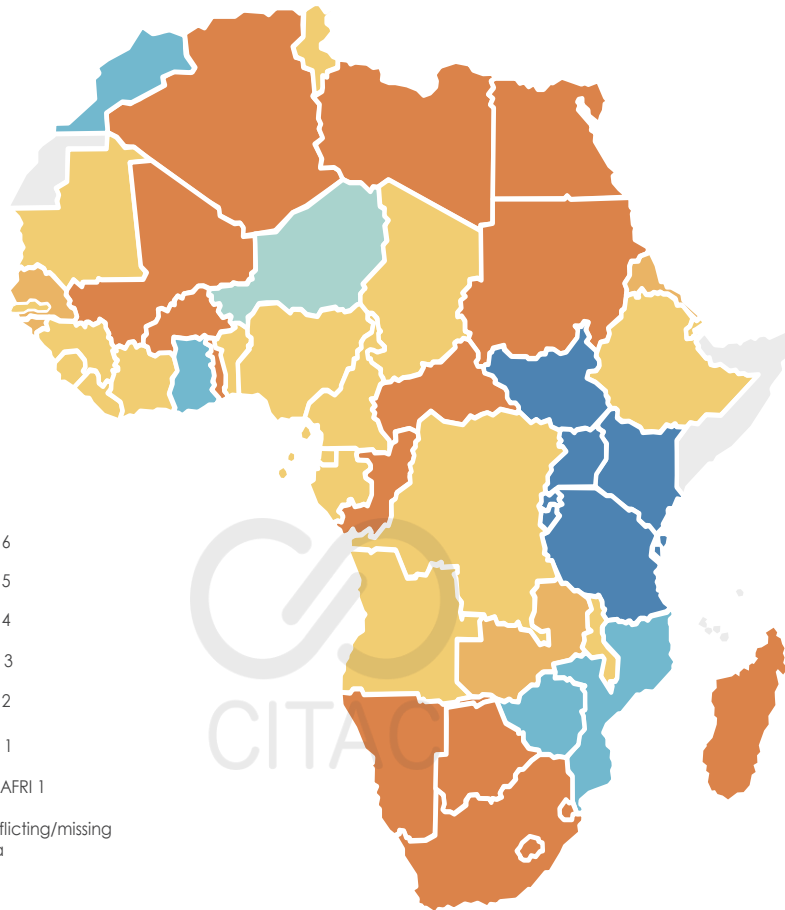


# AFRI Road Map – Gasoil (Diesel)

	Gasoil AFRI specifications						Methods
	AFRI-1	AFRI-2	AFRI-3	AFRI-4	AFRI-5	AFRI-6	
Sulphur content, % mass, max.	0.800	0.350	0.050	0.005	0.005	0.001	ASTM D2622 /ASTM D5453 <sup>[1]</sup> / IP336 / ASTM D4294 / EN ISO 20846 / EN ISO 20884 / EN ISO 13032
Density at 15°C, kg/m <sup>3</sup> , min/max. <sup>[2]</sup>	800 / 890	800 / 890	800 / 890	820 / 880	820-880	820-845	ASTM D1298 / ASTM D4052 / IP 160 / IP 365 / EN ISO 3675 / EN ISO 12185
Cetane Index (calculated), min.	42	45	45	45	46	46	ASTM D976 / ASTM D4737 / EN ISO 4264
Cetane Number, min.	n/a	n/a	n/a	n/a	49	51	ASTM D613 / ASTM D6890 / ASTM D7688 / ASTM D7170a / IP 41 / EN ISO 5165 / EN 15195
Polycyclic Aromatics Hydrocarbons (PAH), max	n/a	n/a	n/a	n/a	11	8	IP 391 / ASTM D2425 / EN 12196
Lubricity (HFRR @ 60 °C), micron, max.	to be reported	to be reported	460	460	460	460	ISO 12156-1 / CEC –F06-A-96
FAME content, vol%, max.	7	7	7	7	7	7	EN 14078
Oxidation stability, hr, min <sup>[3]</sup>	20	20	20	20	20	20	EN 15751

1. In case of dispute test method ASTM D5453 shall be used.
2. In case of dispute test method ASTM D4052 shall be used.
3. Applicable only to gasoil/diesel containing > 2% v/v FAME

# ~US\$15.7B required to upgrade African Refineries to produce AFRI-6 (10 ppm Sulphur) Fuels



REGION	COST ESTIMATE (+/- 50%)
North Africa	US\$ 5.955 Billion
West & Central Africa	US\$ 6.285 Billion
East & Southern Africa	US\$ 3.415 Billion
<b>GRAND TOTAL</b>	<b>US\$15.655 Billion</b>

Source: CITAC

NOTE: Cost Estimates are +/- 50%