The power of partnerships and collaboration to support the PCFV Euro-4 campaign
Anti-trust Guidance
Guidelines for Ipieca meetings

DO NOT DISCUSS or MAKE ANY AGREEMENT ON the following topics:

• Prices or costs of petroleum products
• Capacity, stock levels or inventories
• Sales/purchases
• Future company business plans
• Matters relating to individual customers/supplies
• Employee compensation, benefits, remuneration, etc.
• The costs of compliance with legislation – environmental or otherwise

DO SEEK LEGAL ADVICE before participating in the following potentially sensitive activities:

• Gathering and exchanging statistical information
• Benchmarking
• Creating industry standards or best practices
• Self-policing regulations
• Ipieca-sponsored research

DO OBJECT if an improper or questionable subject is raised and ensure your objection is recorded in the minutes.

DO ENSURE agendas and minutes of meetings are produced and circulated to all attendees, and accurately reflect the discussions that occur.
Promoting Cleaner Fuels and Vehicle Emissions Standards: Regional Considerations and Key Partnerships for Success

Anibor Kragha
ARDA Executive Secretary

UNEP Africa Meeting – IPIECA Side Event
Nairobi, Kenya
November 29th, 2022
Introduction to ARA / ARDA

• ARA = African Refiners and Distributors Association (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
Africa’s Growing Petroleum Products Demand must be met with Cleaner Fuels

• 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
**Global Best Practice – Fuels and Vehicles operating as Single System**

<table>
<thead>
<tr>
<th>Cleaner Fuels + Modern Vehicles</th>
<th>Low-quality Fuels + Modern Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Harmonious system</strong></td>
<td>• <strong>Unbalanced system</strong></td>
</tr>
<tr>
<td>• Cleaner fuels in vehicles; effective emission control systems</td>
<td>• Low quality fuels in vehicles</td>
</tr>
<tr>
<td>• Fewer harmful emissions</td>
<td>• Impaired emission controls systems and more harmful emissions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cleaner Fuels + Older Vehicles</th>
<th>Low-quality Fuels + Older Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>• <strong>Unbalanced system</strong></td>
<td>• <strong>Harmful system</strong></td>
</tr>
<tr>
<td>• Cleaner fuels; absent or inadequate emissions control systems</td>
<td>• Low quality fuels in vehicles; inadequate or absent emission controls systems</td>
</tr>
<tr>
<td>• Lower SOx emissions in exhaust; no reduction in other harmful emissions (NOx &amp; Particulates)</td>
<td>• Very high harmful emissions</td>
</tr>
</tbody>
</table>

- Fuel specifications easier to control; do not achieve clean air alone
- Controls on new vehicles and in-use fleet both essential for results
- Regulations only meaningful when enforced
AFRI Specifications Roadmap

- Started in 2006 as response to lead removal from gasoline; goal to improve public health and reduce mortality rate(s) related to exhaust emissions and air quality

- Developed into Product Quality Specification Roadmap for Africa with key goals:
  - Improve overall air quality
  - Aid refinery investment planning
  - Establish roadmap towards achieving global product quality to match evolving car fleet, African climatic conditions and emission standards
  - Consider engines and fuel as single system for improving standards for exhaust emissions
  - Harmonise regional fuel specifications along natural supply chains to reduce bulk transportation costs and to optimise regional logistics infrastructure
  - Synchronise taxes, excise duties and subsidies to reduce smuggling and adulteration of fuels

- Regional harmonisation of fuel quality, taxes, duties and vehicle emissions often overlooked (due to sulphur debate); remains key part of AFRI Roadmap & Policy
Key Initiative – AU Adoption of ARDA AFRI Clean Fuels Policy

- 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**

- **Cleaner Fuels**
  - Refinery Upgrades
  - Import Quality
  - Regional Harmonisation

- **Cleaner Vehicles**
  - Import Age and Quality
  - Inspection and Maintenance
  - Emission Standards

- **Cleaner Air**
Sulphur Compliance – AFRI vs. Official Specs

**GASOIL/DIESEL**

<table>
<thead>
<tr>
<th>Specs</th>
<th>Majority of AU States have one specification only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exceptions: S. Africa, Botswana, Lesotho, Eswatini</td>
</tr>
</tbody>
</table>

| Grades         | 11 different permissible grades with sulphur content ranging from 10ppm to 10,000ppm |

**GASOLINE**

<table>
<thead>
<tr>
<th>Specs</th>
<th>44 of 54 AU States have one specification only</th>
</tr>
</thead>
</table>

| Grades         | 12 different permissible grades with sulphur content ranging from 10ppm to 2,500ppm |

Source: CITAC
ARDA leading Specs Harmonisation Drive

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
- Implementation now progressing in various countries

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
## ARDA Fund for Refinery Upgrades for Clean Fuels and Storage & Distribution Infrastructure

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

Source: CITAC – Cost Estimates are +/- 50%

---

**ARDA FUND FOR BANKABLE AFRICAN DOWNSTREAM PROJECTS**

1. ARDA-endorsed African Refinery projects that deliver cleaner fuels and reduce carbon emissions while reducing petroleum products imports

2. Strategic Storage & Distribution infrastructure investments across Africa
East Africa Roadmap to Fuel Specifications

• Progressive lowering of sulphur standards
  ➢ Example for Diesel: 10,000 ppm – 5,000 – 500 – 50 ppm

• June 2013: East African Ministers approved harmonized low sulphur standards
  ➢ 50 ppm for diesel
  ➢ 150 ppm for gasoline

• East African Community (EAC) harmonized standards gazetted in December 2013

• Standards became effective one year later (January 1, 2015)

• East Africa became first non-OECD sub-region to move to cleaner, low-sulphur fuels

Source: UNEP
ECOWAS making positive strides towards adoption of AFRI Fuel Standards

- 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 the national transposition of the Directive

- Actions have been taken by countries with refineries (Senegal, Côte d’Ivoire, Niger) to make required investments to comply with the Directive by 2025

- 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)

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>Adopted since 2017</td>
</tr>
<tr>
<td>Benin</td>
<td>Interministerial Act enacted March 2021</td>
</tr>
<tr>
<td>Cape Verde</td>
<td>Aligned May 2021, Official Journal</td>
</tr>
<tr>
<td>The Gambia</td>
<td>National Standard aligned with Directive but not yet gazette</td>
</tr>
</tbody>
</table>

Source: ECOWAS (Sept. 2022)

- Other countries preparing to upgrade their refineries for 2024 deadline
  - Niger, Côte d’Ivoire, Senegal

- Others have initiated national consultation(s) to find solutions to address identified challenges
  - Burkina Faso, Mali, Senegal
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
Coordinated Communications Campaigns critical to promote Benefits of Cleaner Fuels & Vehicles

- ECOWAS needs to build on work already done by bodies including
  - African Refiners and Distributors Association (ARDA)
  - African Union Commission
  - United Nations Environment Programme (UNEP)
  - NGOs (ICCT, SAPIA, IPIECA, others)

- Campaigns must communicate benefits of harmonised specifications for cleaner fuels & vehicles to public and relevant stakeholders (see prior slide)

- Specific Benefits include:
  - Clean air resulting in fewer premature deaths
  - Healthier population overall
  - Economic benefits of the above, including streamlined supply
  - Fact that above benefits far outweigh the costs
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 for more information
Thank You for your Attention
# AFRI Road Map – Gasoline

<table>
<thead>
<tr>
<th>Method</th>
<th>AFRI-1</th>
<th>AFRI-2</th>
<th>AFRI-3</th>
<th>AFRI-4</th>
<th>AFRI-5</th>
<th>AFRI-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>RON, min. (^{(1)})</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>93</td>
</tr>
<tr>
<td>MON, min.</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>83</td>
</tr>
<tr>
<td>Lead content, mg/l, max. (^{(2)})</td>
<td>Unleaded</td>
<td>Unleaded</td>
<td>Unleaded</td>
<td>Unleaded</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Sulphur content, % mass, max.</td>
<td>0.100</td>
<td>0.050</td>
<td>0.030</td>
<td>0.015</td>
<td>0.015</td>
<td>0.005</td>
</tr>
<tr>
<td>Benzene content, vol%, max.</td>
<td>to be reported</td>
<td>to be reported</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Aromatics, vol%, max.</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td>Density at 15°C, kg/m³ min-max</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>725-780</td>
<td>725-775</td>
</tr>
<tr>
<td>RVP, kPa, max.</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Ethanol content, vol%, max. (^{(4)})</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Manganese content, mg/litr, max.</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>18</td>
<td>6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Method</th>
<th>AFRI-1</th>
<th>AFRI-2</th>
<th>AFRI-3</th>
<th>AFRI-4</th>
<th>AFRI-5</th>
<th>AFRI-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphur content, % mass, max.</td>
<td>0.800</td>
<td>0.350</td>
<td>0.050</td>
<td>0.005</td>
<td>0.005</td>
<td>0.001</td>
</tr>
<tr>
<td>Density at 15°C, kg/m³, min/max</td>
<td>800 / 890</td>
<td>800 / 890</td>
<td>800 / 890</td>
<td>820 / 880</td>
<td>820-880</td>
<td>820-845</td>
</tr>
<tr>
<td>Cetane Index (calculated), min.</td>
<td>42</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Cetane Number, min.</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>49</td>
<td>51</td>
</tr>
<tr>
<td>Polycyclic Aromatics Hydrocarbons (PAH), max</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Lubricity (HFRR @ 60 °C), micron, max.</td>
<td>to be reported</td>
<td>to be reported</td>
<td>460</td>
<td>460</td>
<td>460</td>
<td>460</td>
</tr>
<tr>
<td>FAME content, vol%, max.</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Oxidation stability, hr</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

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

### Methods

- ASTM D976 / ASTM D7347 / EN ISO 4264
- ASTM D613 / ASTM D6890 / ASTM D7688 / ASTM D770a / IP 41 / EN ISO 5165 / EN 15195
- IP 391 / ASTM D2425 / EN 12196
- ISO 12156-1 / CEC-F06-A-96
- EN 14078
- EN 15751

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Anibor Kragha – ARDA Executive Secretary
Panel session

Moderator

Jane Akumu
UN Environment Programme

Avhapfani Tshifularo
South African Petroleum Industry Association

Olivier Berthaud
TotalEnergies

Ewan McKenzie
Climate Director
Ipieca
Supporting PCFV and its Euro4 implementation strategy
As a UNEP PCFV founding member

Working in partnership with UNEP PCFV, Ipieca assisted the oil and gas industry in implementing downstream strategies and resources for phasing out leaded gasoline.

Ipieca will now work again with UNEP PCFV on Euro4 fuels standards and support the global strategy.

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