

# Afri Specifications – African Refiners Association

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# What is ARA?

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- In March 2006, refiners from all over Africa voted to create an NGO, the African Refiners Association, to represent their interests and to address issues that impact the African downstream oil industry.
- The role of the African Refiners Association has evolved to give a voice not to only African refiners but also to independent importers, distributors and marketers across Africa.

# What is ARA?

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- An NGO that has the aim of helping African Refiners and Importers/Marketers manage the pan-African challenges of the future
  
- Examples
  - Changes to product specifications
  - Changes in global trade patterns
  - Deregulation/free market
  - Exchange of experience

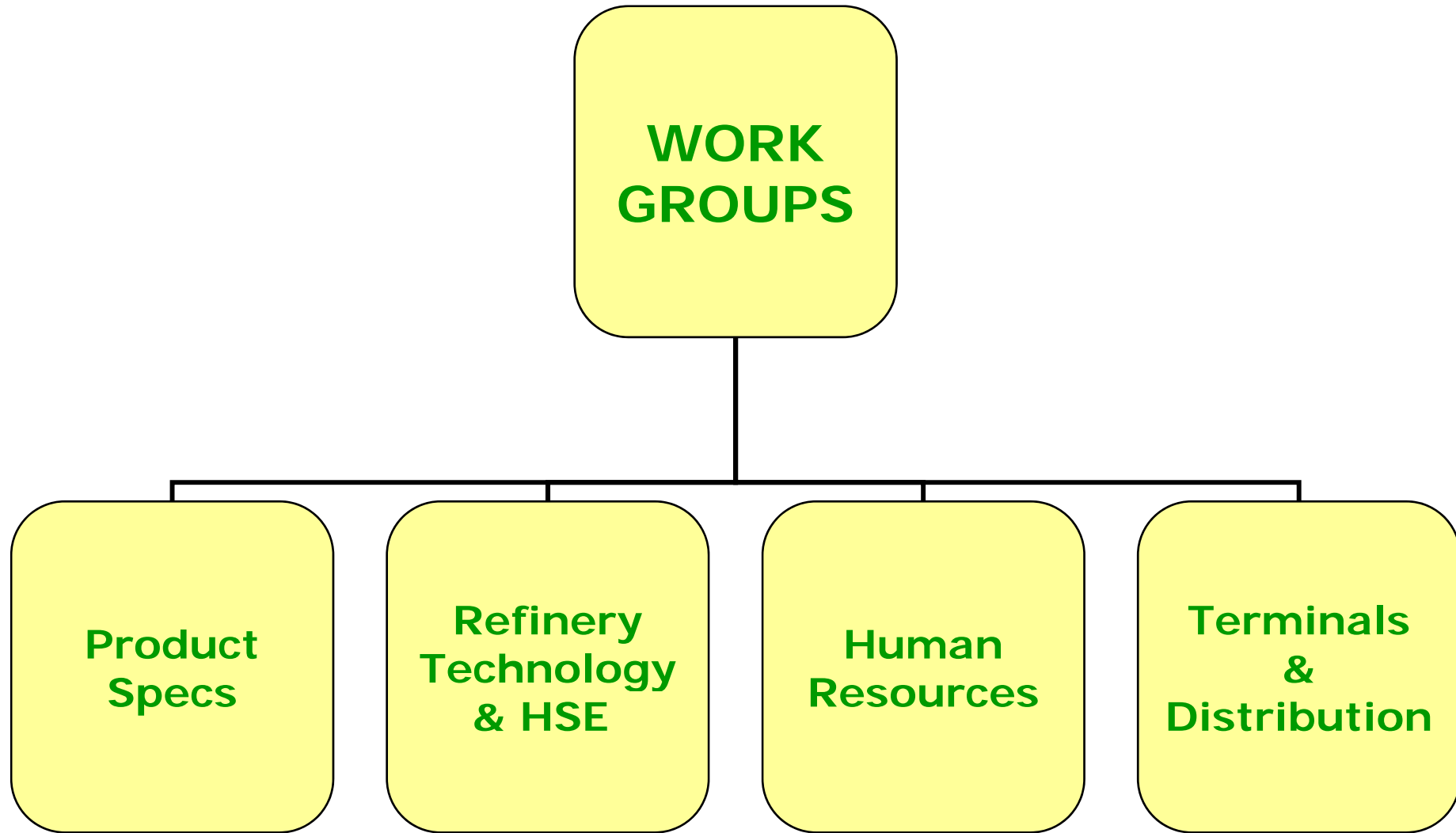
# Who is the ARA?

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- 22 of the 25 refining companies in Africa are paid up members
  - Covers 37 of 40 operating refineries
- 28 companies are paid up Associate Members
  - AM's are importers, terminal operators, regulators, major marketers, shippers
- Nearly 50% of ARA revenues come from sponsorship
- Major sponsors: NNPC, Sonangol, Total, BNP Paribas, PetroSA, SIR and SAMIR

# ARA – exchanging best practice



# ARA Major Initiatives

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- 1. Specifications Policy**
- 2. World Bank/ARA Sub-Saharan Africa Refining & Health Study**
- 3. Gulf of Guinea Ship Vetting Study**
- 4. Creation of African Academy in refining and sustainable development at Samir Mohammedia Morocco**

# 1- ARA Specifications Policy

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# 1. ARA Specifications Policy



By 2010

By 2020

GASOLINE	By 2010			
	AFRI-1	AFRI-2	AFRI-3	AFRI-4
Ron, min*	91	91	91	91
MON, min	81	81	81	81
Lead content**	Unleaded	Unleaded	Unleaded	Unleaded
Sulphur content, % mass, max	0.1	0.05	0.03	0.015
Benzene content, % vol, max	to be reported	to be reported	5	1
DIESEL	By 2020			
	AFRI-1	AFRI-2	AFRI-3	AFRI-4
Sulphur content, % mass, max	0.8	0.35	0.05	0.005
Density at 15°C, kg/litre (min/max)	800/890	800/890	800/890	820/880
Cetane index (calculated), min	42	45	45	45
Lubricity (HFRR @ 60°C), micron, min	to be reported	to be reported	460	460

\*A higher grade of gasoline may be marketed if required

\*\*'Unleaded' means <0.013g of lead per litre

- **ARA Executive Committee meeting of January 2010 set target dates for the AFRI specifications alongside a number of government initiatives needed to reap the environmental and economic benefits of the product improvements and the necessary refinery and logistic investments**

# ARA Specifications Policy

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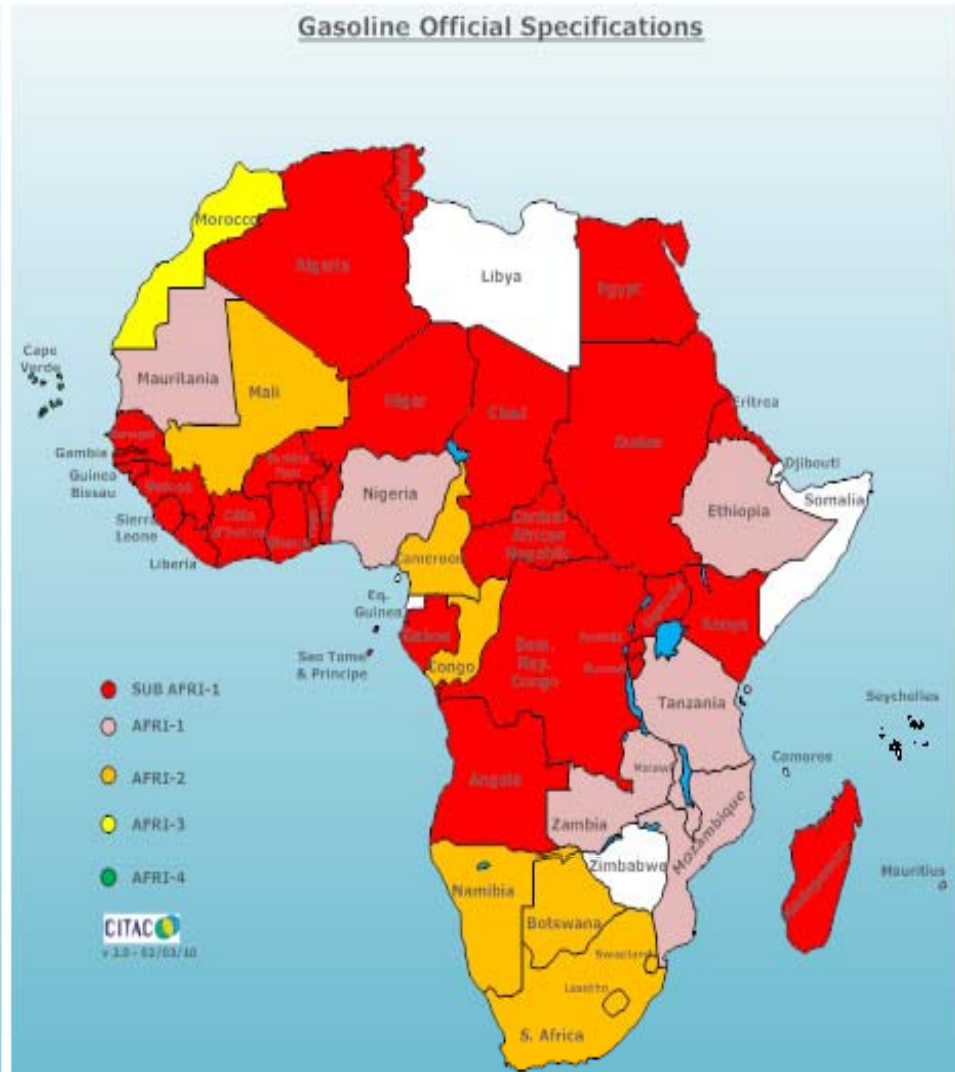
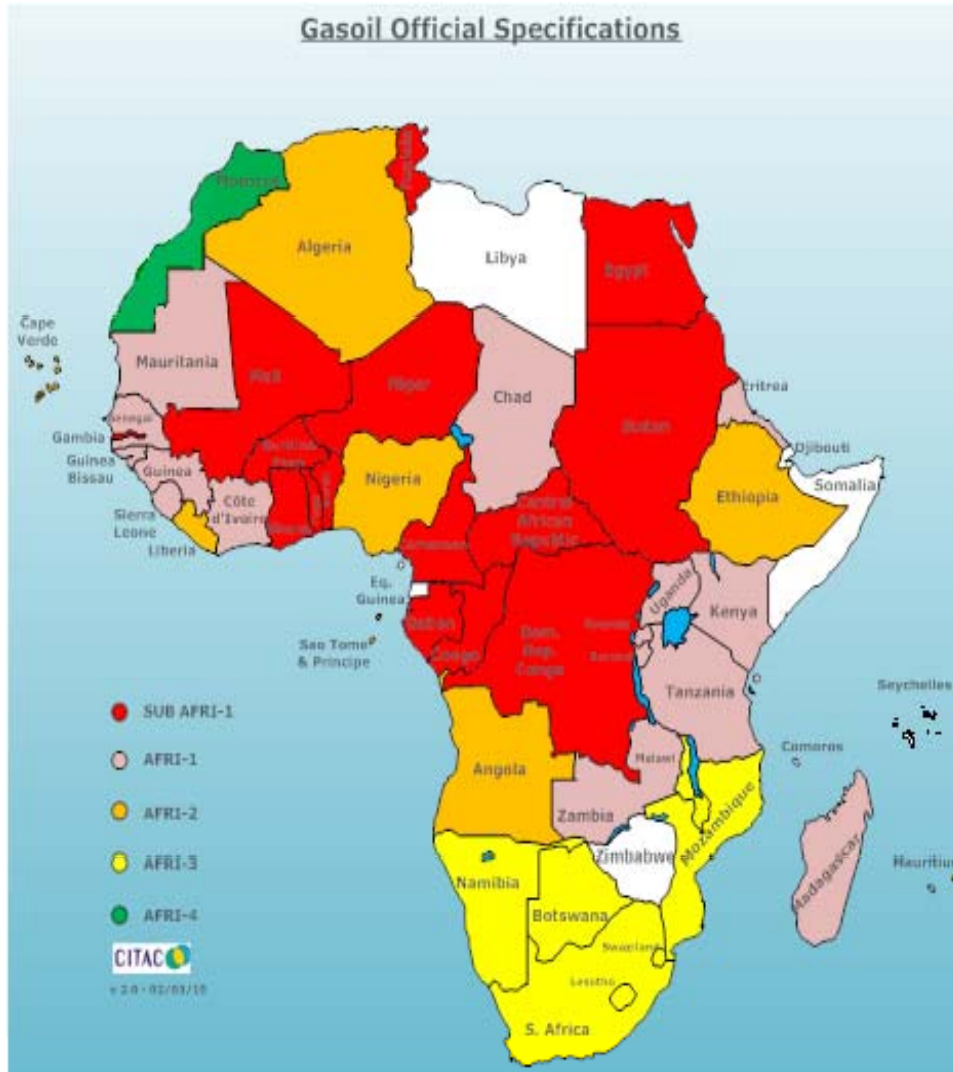


ARA objective : Afri-2 by end 2010; Afri-4 by 2020

Challenge is to coordinate regional changes to official specifications to avoid 'dumping': most local refineries already achieve AFRI-2 or 3

# ARA Specifications Policy

## Official Spec: Source CITAC



## 2- Sub-Saharan Africa Refinery & Health Study

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- **Sponsored by The World Bank and the African Refiners Association**
- **Lead consultant: ICF International**

# Sub-Saharan Africa Refinery Project

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**The Sub-Saharan Africa Refinery Project estimated the costs of improving the quality of transportation fuels consumed in Sub-Saharan Africa and compared them with the potential health benefits of reduced emissions in urban areas of the region**

**The contract was awarded to Washington DC consultants ICF International**

# STEERING COMMITTEE

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Joel Dervain – SIR

Olu Akani – NNPC

Muzi Mkhize – South Africa Ministry of Minerals & Energy

John Mruttu – KPRL

Kouassi Bandama Gilbert – Cote d'Ivoire Ministry of Mines and  
Energy

Charles Obanga – CORAF

Eleodoro Mayorga Alba – World Bank

Mark Elliott – CITAC

Rob de Jong – UNEP

Rob Cox – IPIECA

# Key results

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## 1. Health Study

- The most significant decrease in air-pollution-related mortality and cases of disease was associated with improved transportation fuels combined with improved vehicles and attendant programs.
- Monetary benefits are likely to be high.

## 2. Refinery Sector Study

- SSA refineries that are efficient and complex with access to markets and good quality local crude oils, can economically supply AFRI-4 products, will improve their margins, and likely will expand.
- SSA refineries that are small and/or inefficient will face growing challenges.

## 3. Comparison of Health Benefits and Costs

- Benefits are greater than costs in West Africa more than in East Africa, but only slightly positive in South Africa which already has good quality fuels and fewer diesel vehicles

# ICF SSA Health Study

# Overview of the SSA Health Study

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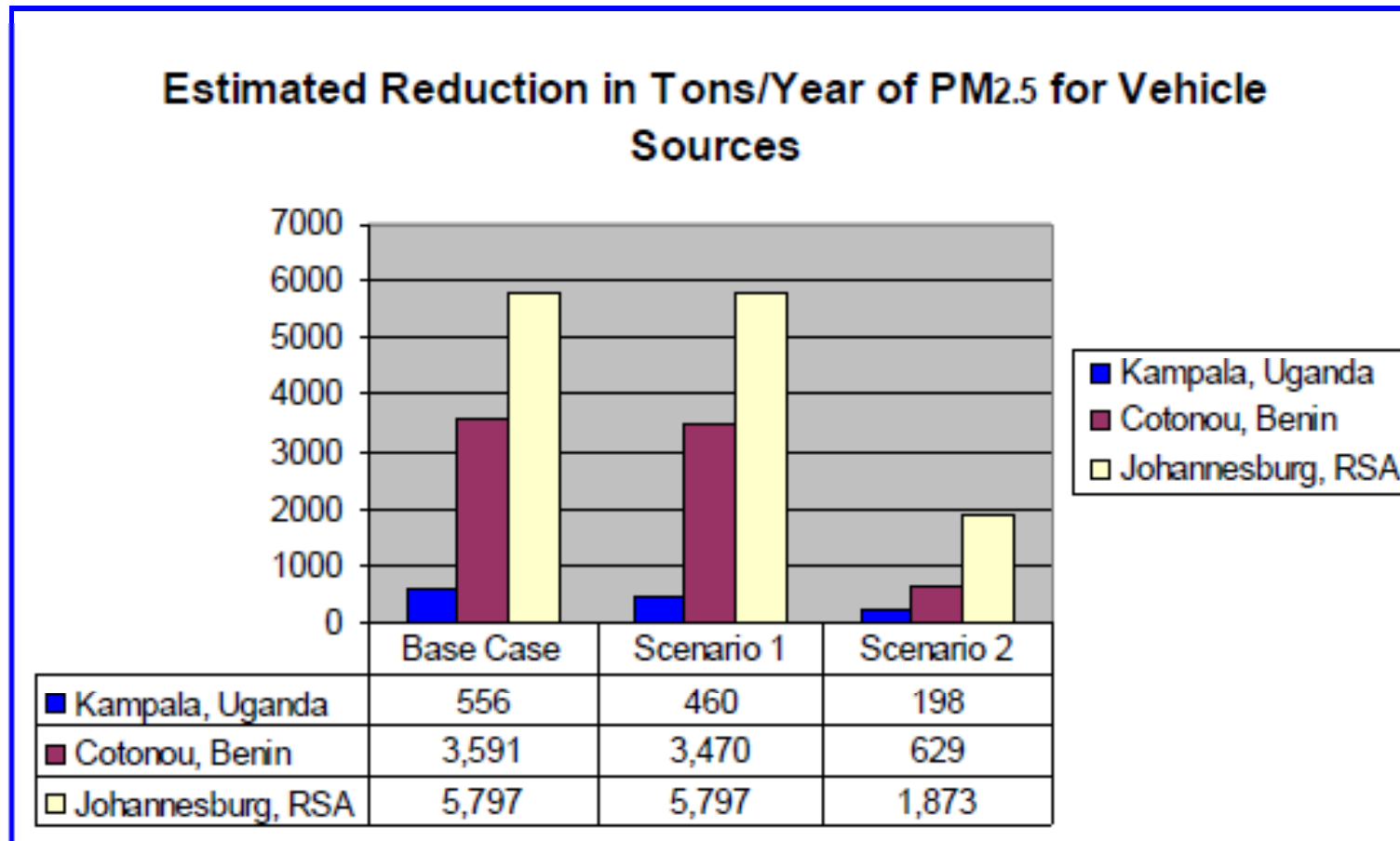


## Three scenarios were developed:

- **Base Case** - current estimates of emissions from all primary sources of air pollution with existing fuel quality
- **Scenario 1** - improved fuel quality specifications (AFRI-4)
- **Scenario 2** - improved fuel quality specifications, plus the use of pollution control equipment on all vehicles, phase-out of 2-stroke motorcycles, and increase in number of automobiles.

# Scenario 2 delivers the results

Modeled Reductions of PM<sub>2.5</sub> (tons/year) for Vehicle Sources in Three Cities



# SSA Health Valuation



- The study is a first attempt to estimate the value of mortality and respiratory disease risk reductions in SSA.
- Determined the appropriate approach:
  - Willingness-to-pay (WTP) estimates are put forward as the most appropriate for benefit-cost analysis, because they represent the types of trade-offs to be considered.
  - However, WTP depends on income, and therefore it varies across individuals, countries, and communities with different income levels.
- Appropriate estimates of income elasticity are uncertain and impact the results significantly
- The Study concludes that further research is necessary to confirm the health savings

# ICF – SSA Refining Study

# Major SSA Assumptions for Modeling



- Two market outlooks considered: favourable and unfavourable
- Under both scenarios:
  - Free market economics are assumed (or governments pay their subsidy obligations so that shareholders are rewarded for their investment based on market pricing)
  - Distillates have highest growth, above gasoline
  - Residual fuel demand also grows (Africa East and West).
  - No changes in qualities for fuels other than gasoline and gasoil/diesel
  - A Uganda refinery of 50kbbbls/day is assumed. This assumption must be borne in mind when examining the model results. This is not an economic solution, but a decision by the Steering Committee
  - Evolution to AFRI-4 specifications assumed

# SSA Refinery Study Results: Unit Costs of AFRI-4



Incremental product supply cost (AFRI gasoline & diesel) depends on region and depends on the scenario.

- Estimated cost range is \$0.023 – 0.044/litre for AFRI-4 gasoline/diesel

Year	Units	SAA	Africa	Africa	Africa
		Total	West	South	East
2020	\$/bbl	\$5.50	\$6.30	\$3.67	\$7.00
	\$/tonne	\$43.78	\$50.15	\$29.21	\$55.72

Average of different cases

## Refinery Study Results: Summary of SSA Expansion Potential

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- Several SSA regions have the advantage of local, good quality crude supply coupled with local product demand
  - Larger, more complex and efficient refineries look to have the ability to supply AFRI-4 products and to expand
  - In addition, potential appears to exist for new “world-scale” refinery capacity in West Africa between 200,000 to 400,000 bpd, depending on unfavorable or favorable scenarios
  - Small, simple, inefficient refineries face increasing challenges even when inland and/or with local crude supply
  - Market economics apply in the analysis.
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# SSA Refining/Supply Costs versus Health Benefits



Comparison of the cumulative refinery investment costs to 2020 and health benefits (Scenario 2) on a net present value basis over 10 years are shown below.

(in billion U.S. 2007 dollars) <sup>1</sup>	SSA Total	Africa West	Africa East	Africa South
Refinery Investment Costs to 2020 <sup>2</sup>	\$6.19	\$2.98	\$2.56	\$0.64
Health Benefits over a 10-year period <sup>3</sup>	\$43.00	\$32.00	\$9.0	\$1.8

Notes:

1. Open Market AFRI-4 favorable case.
2. Calculated as net present value, 7% discount.
3. Central tendency value shown. Calculated as net present value, 7% discount. **Using values from Health Study Scenario 2 with alternate 2-stroke motorcycle use assumptions (fuel improvements, improvements in vehicle pollution controls, phase-out of all 2-stroke motorcycles, increase in vehicle use).**

# Study Conclusions

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SSA refineries that can economically produce transport fuels to AFRI-4 specifications should develop the appropriate investment plan

The benefits from cleaner fuels only become significant in Scenario 2 whereby:

- Governments should adopt and enforce regulatory measures to improve the vehicle fleets such as:
  - All imported gasoline powered cars must have functioning catalytic converters.
  - Establish an inspection and maintenance program.
  - Encourage the phase-out of old, highly polluting vehicles.
  - Encourage the phase-out or banning of 2-stroke engines.

# Study Conclusions

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- To reduce the uncertainties confronted in this study, Governments and International Agencies should conduct additional research with respect to:
  - Data on emissions in major urban centers (including permanent installations for measuring pollution levels)
  - Examination of the appropriate methodology for estimating health costs and benefits in developing nations
  - Improvements of data on product demand

# Study Conclusions



- The WORLD® model indicates that, based on the demand projections used, major expansion will be needed in existing refineries, as well as new regional refineries in the Africa West/Angola region.
- Lesser growth is expected in Africa East and refining investment will probably be tied to Ugandan crude oil. More focused technical studies should concentrate on these regions
- Open market policies should be expanded to allow refineries to improve their revenue as they move to AFRI-4 standards and are rewarded for their investment by increased refining margin
- Policy makers need to decide the future of the mainly topping/reforming refiners such as those in Senegal, Congo, Gabon, and Kenya. The study indicates the magnitude of the costs of modernizing and operating these refineries to meet the AFRI-4 specifications vs. importing products

# Next Steps

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- Review the detail of the Study (available on download from the ARA website ([www.afrra.com](http://www.afrra.com)))
- The financing challenge is to bridge the gap between the health benefits which arrive some years later which accrue to the State and the up-front investment which is borne by the refiner
- Market conditions are unhelpful

# Next Steps

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- Each ARA member is engaging with its Government to gain support for upgrading investment in a long-term stable fiscal and regulatory environment
- The ARA Executive is developing further contacts with the World Bank, IFC and the IMF, as well as other stakeholders, to establish how to develop a coherent and coordinated policy to benefit the African downstream community and the environment
- Can such a study approach be extended to the North?

# The African Refiners Association

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**Thank you for your attention  
Questions?**