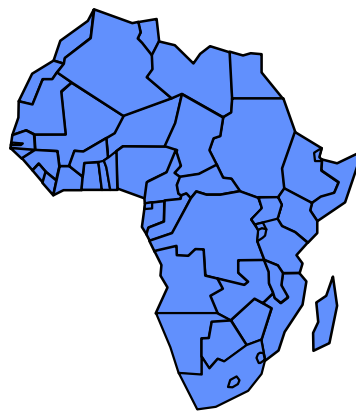




Clean Air Initiative

A Road Map to Lead Phase Out A Few Case Studies



Michel S. Muylle
Dakar Conference, June 26-28, 2001



Content

- Methodology
- A Few Case Studies
- Refining
- Lessons Learned
- Role of the World Bank Group
- Conclusions



The Perfect Road Map

Analysis

- Health impact
- Oil industry (supply and distribution)
- Vehicle fleet
- Cost implications

Consensus building

- Octane pool and other fuel quality requirements
- Fuel price policy (incl. kero and diesel)
- Quality control mechanisms (fuels, vehicles, contamination)

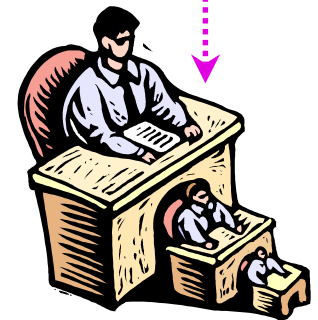
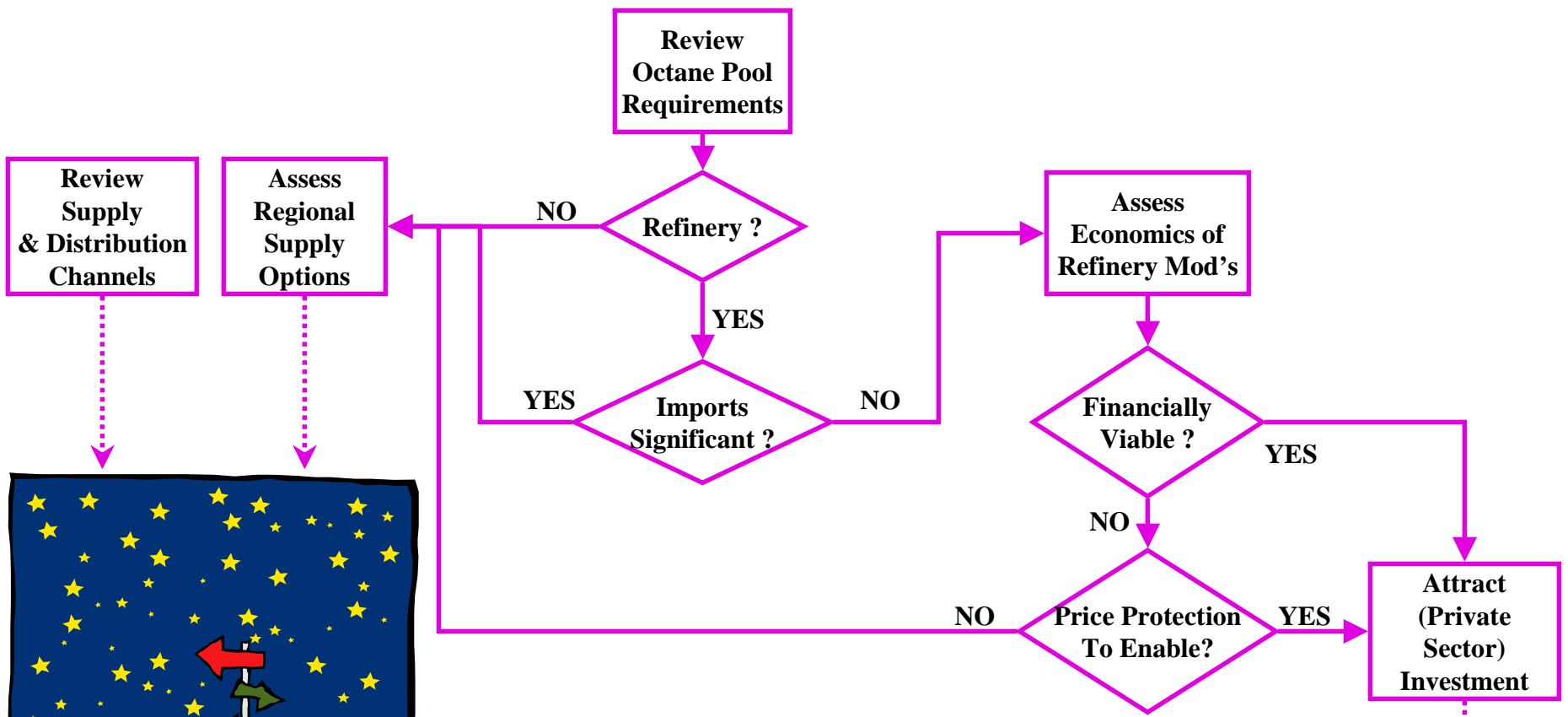
Communication

- Stakeholders awareness (oil companies, transport, health, ...)
- Public outreach and education

Implementation ...



Decision Tree





Case Studies

A Recap with a few lessons learned



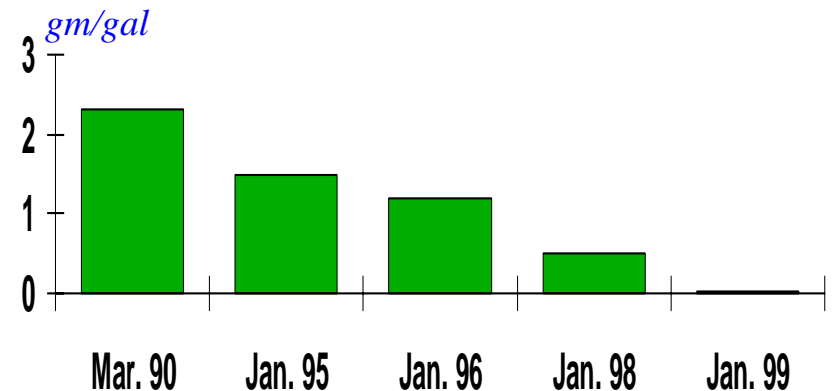
Rep. Dominicana - Lead Phase Out

Unleaded is a Consumer Product:

- 1991 : Shell introduces Premium unleaded in Dom Rep
- Unleaded priced 20% above leaded gasoline
- Market share of 10% unleaded in little over one year
- Main consumer class : motorcycles !!

Enabling

- 50%+ of country demand is imported
- Single import facility allows for economies of scale
- Regulation allows 3rd party imports
- Region avails of high octane blends
- Reduce octane pool to match refinery configuration

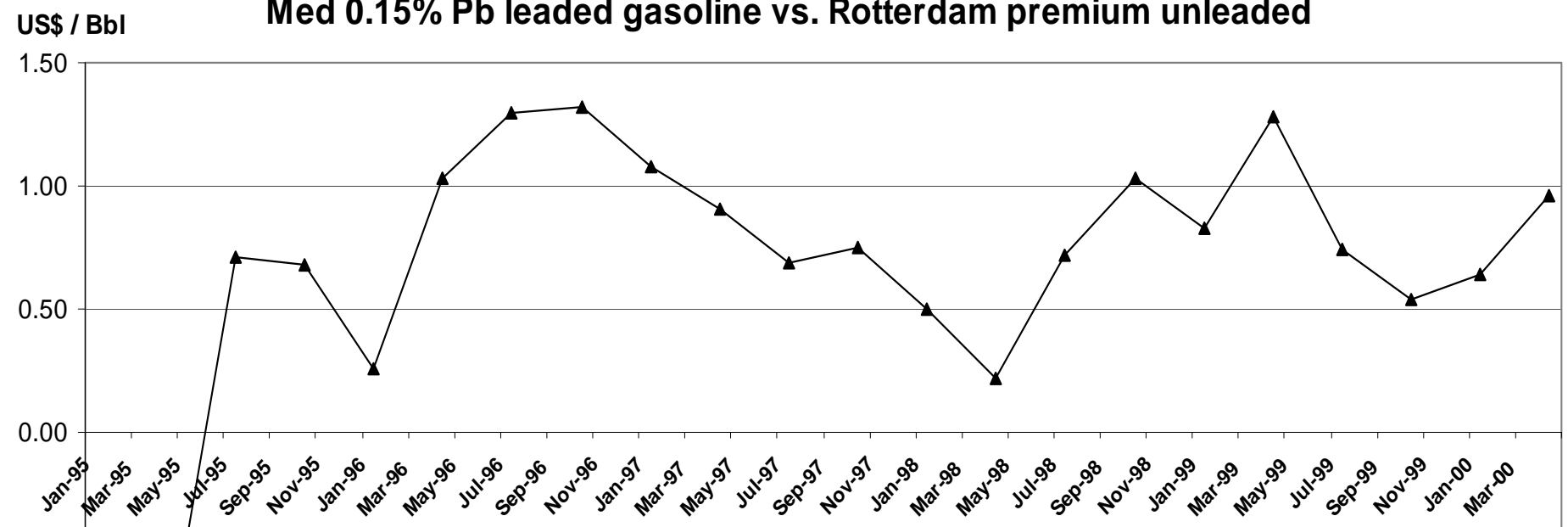




Haiti - Lead Phase Out

Unleaded can be Cheaper !

Relative Pricing of
Med 0.15% Pb leaded gasoline vs. Rotterdam premium unleaded



Enabling

- 100%+ of country demand is imported
- Possibility to reduce octane requirement
- Region avails of high octane blends
- Coordination with distributors

Note : product pricing is not solely affected by octane and lead but also by other specifications and supply & demand patterns. The above graph is an illustration of how two similar products are priced relative to each other.



El Salvador – Lead Phase Out

Urbanization : respiratory diseases public health enemy No 1!

Lead eliminated in less than one year !

- Avoided investments in dual fuel supply systems
- Limited period of possible cross contamination
- Complemented with efforts on regional harmonization and vehicle emission standards

Enabling

- Prices deregulated
- Downstream sector in private sector
- Product imports

Cost of lead phase out : \$ 0.01 / liter



Chile – Lead Phase Out

Pollution in Santiago de Chile

Comprehensive emissions reduction strategy !

- Transport responsible for 1/3 of PM emissions
- Catalytic converters most effective solution

⇒ NEED FOR LEAD PHASE OUT

Enabling

- Thorough analysis of pollution was possible
- Participatory and comprehensive approach
- Refineries world scale



Jamaica - Lead Phase Out Plan

Commitment from heads of state at Summit of the Americas

Change the octane grades !

- Increasing proportion of Japanese vehicles
- No benefit from higher octane gasoline
- Adjust taxes on premium leaded gasoline

Enabling

- Car population enabled lower octane
- Overall reduction of octane pool avoids investments
- Attention to the fiscal regime



Import Countries

- **Few if any constraints to phase out lead**
- **Economic cost is small and relatively simple to assess**
- **Timing / Phasing within own control**

Critical issues are

- **regional supply options**
- **import terminal and distribution flexibility**
- **landlocked countries supply options**
- **limited competition / entrenched positions**
- **vehicle fleet (current and future)**
- **public outreach / education**
- **commitment to environment & health**



Refining Countries

- **Refineries impose constraints on lead phase out**
- **Economic cost complex to assess**
- **Timing constrained by investment schedule**
- **Political / Strategic role of refining asset overstated**

Critical issues are

- **small scale and configuration of the refinery**
- **product yields and qualities (a.o. sulphur)**
- **ownership and control of the refinery**
- **regulatory regime**
- **investment climate, availability of finance**
- **demand growth and need for imports are enablers**



Refining Industry in SSA

Scatter of very small to world scale refining

- 15 refineries < 50 kBd
- RSA and Nigeria represent 68% of total capacity
- Performance worrisome
- Sustained role of the public sector inhibits consolidation

Refining configuration

- Light ends upgrading (reforming, isom, alkyl) 16% of CDU capacity
- Excl. RSA & Nigeria, light ends upgrading only 84 kBd
- Low octane pool (primarily semi-regen reforming)
- High penetration of diesel governs crude runs and configuration

Regional supply options

- Short in octane
- Growing dependence on imports



Refining Issues

Limited options for refineries :

- **De-bottleneck semi-regen**
- **Upgrade to CCR (world scale 20-30 kBd)**
- **Isomerisation (front end boost)**
- **Alkylation**
- **Blending of high octane components**

Critical issues are

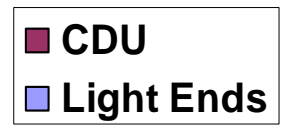
- **small scale and configuration of the refinery**
- **crude diet, product yields and qualities (a.o. naphtha)**
- **investment in product quality gives inadequate returns**
- **ability to recoup investments through product pricing**
- **can investment coincide with capacity growth**
- **octane specifications too high ?**



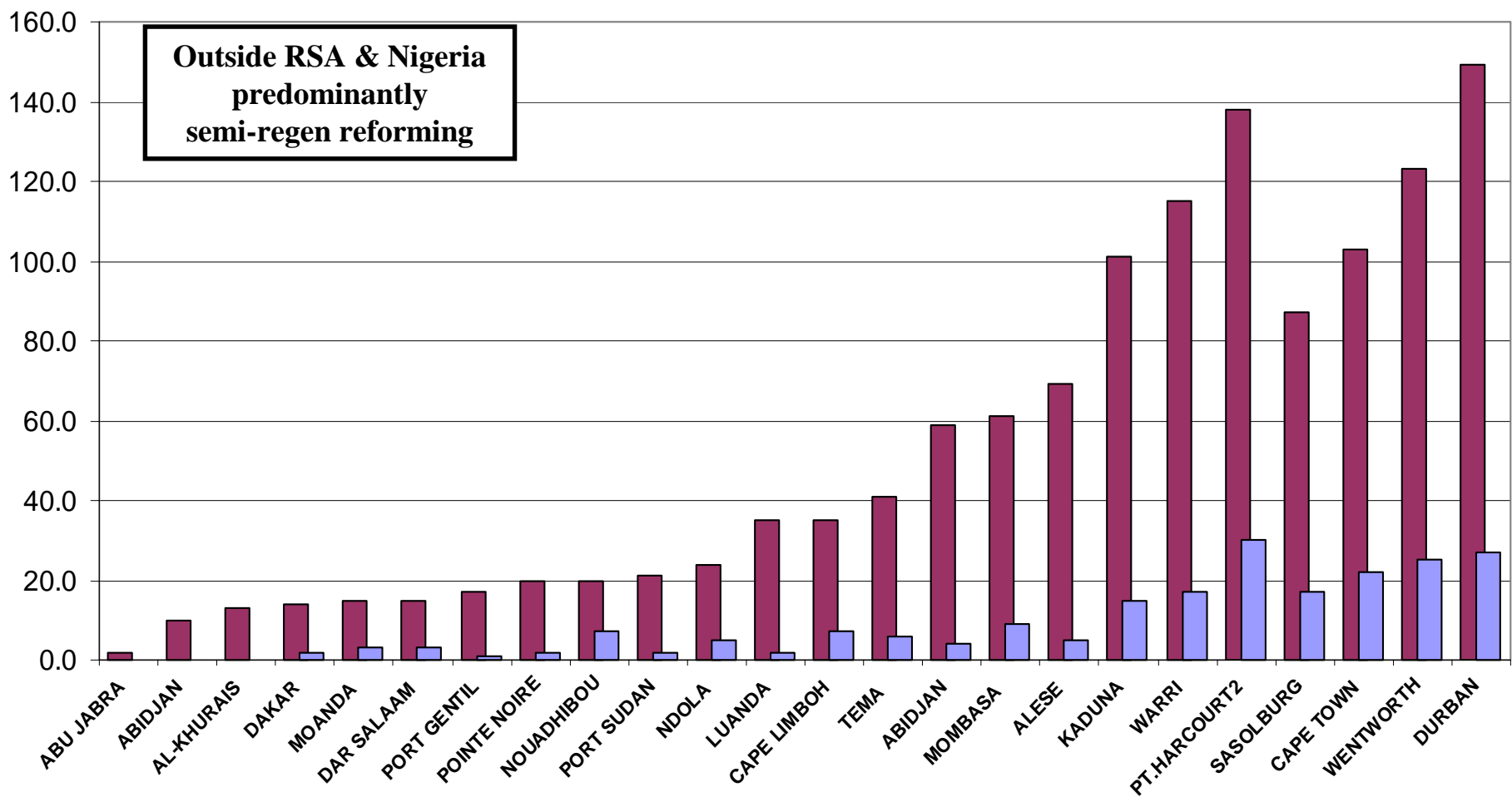
Refining Industry in SSA

Crude Distilling and Light Ends Capacity

kBd



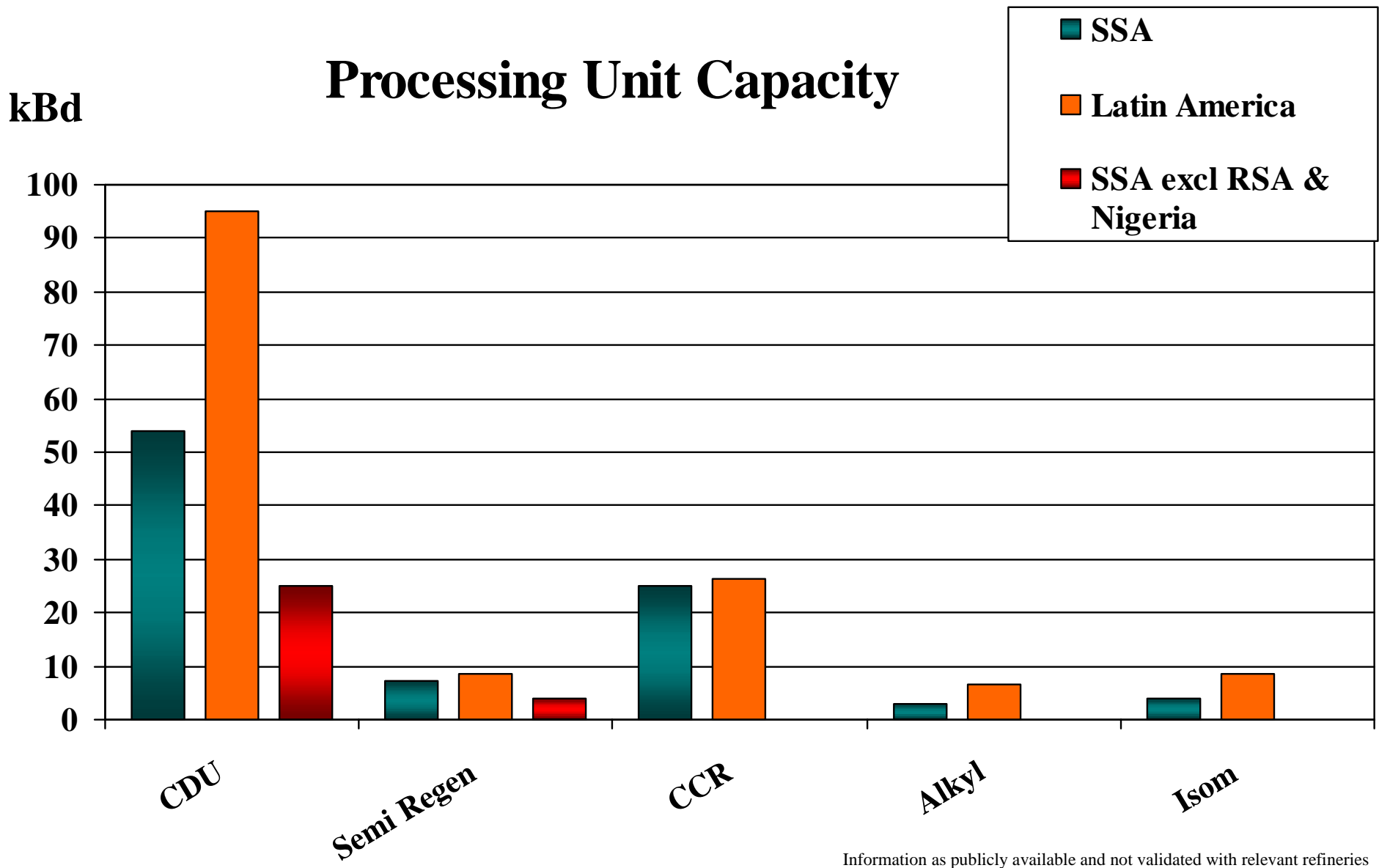
Outside RSA & Nigeria
predominantly
semi-regen reforming



Information as publicly available and not validated with relevant refineries



Refining Industry in SSA



Information as publicly available and not validated with relevant refineries



Refining Issues

Is it time to face reality ?

- **Negative economic rent from small refineries**
- **No appetite to invest**
- **Inability of public sector to sustain participation**
- **Uncertain political stability**
- **Limited sources of finance**
- **Regional supply options offer opportunities**

Consolidate refining AND supply options



A Few Lessons Learned

Aggressive Time Schedules Possible

- One – two year horizon, not five!

Question the octane requirements

- Too many, too few ...
- Fit for purpose (vehicle fleet, driving conditions)
- Reduce octane pool to avoid or delay investments

Let the Market Play

- Early introduction of unleaded as pure market play
- Leverage third party investments (e.g. in refining, distribution)



A Few Lessons Learned (cont'd)

Time it Right

- Regional supply options
- Combine investments in quality with refining capacity

It's not only about lead or octane

- Comprehensive view on pollution from transport
- Fuel pricing policy (incl. kero and diesel)
- RVP, T50, Sulphur, Aromatics, ...
- Comprehensive supply & demand analysis for all fuels

Find a Champion!

- Oil Companies have the greatest leverage
- Large or densely populated cities most to benefit



Role of the World Bank Group

- **Multi-sectoral and regional organisations**
 - Transport
 - Environment
 - Oil & Gas
- **Policy support and capacity building**
 - Product quality
 - Pricing regimes and fuel taxation
- **Risk management**
 - Limited recourse financing
 - Equity
 - Partial Risk Guarantees



Conclusions

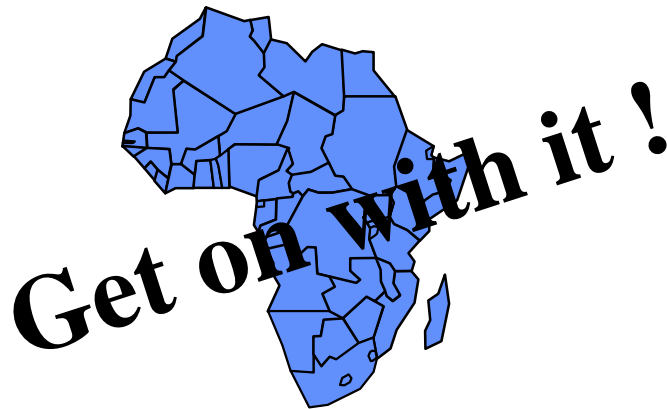
- Get a champion
- Bring the stakeholders together
- Seek best practice in the sector
- Assess critical issues but don't over-analyse
- Consolidate small refineries and supply options
- Leverage the private sector interests
- Aim at early gains

Impossible, n'est pas français !



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