READY, STEADY, GO!

Africa and the Kigali Amendment

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The Kigali Amendment (KA) to the Montreal Protocol builds on 30 years of successfully eliminating ozone depleting substances.

It aims to phase down potent greenhouse gases, HFCs.

Africa is among those regions already suffering from high Global Warming Potential (GWP) substances’ environmental impact.

But the continent also faces a unique opportunity to effectively connect the fast adoption of sustainable low- or zero-GWP* solutions with economic growth, regulatory stability and positive societal change.

Please note that wherever the term “low-GWP” is used, for reasons of simplicity it also includes "zero-GWP" substances with a GWP = 0 (like ammonia R717, water R718, or air R729 as a refrigerant).
ABOUT THE REPORT

- Published by UNIDO with the support from the government of Italy
- Wants to support African countries in spotting priority areas for a successful KA implementation
- 6 chapters on priority areas
- Tech Specs: special annex on natural vs synthetic refrigerants, application sectors, energy-related issues

The report serves as a starting point for discussions and guidance in the "post-Kigali" era.
ABOUT THE REPORT

Where the data comes from:

- **survey**: June 2017 survey among 31 African NOUs / experts

- **UNIDO Vienna Talks & special Africa workshop**
  held 13-15 June 2017 in Vienna

- **follow-up research among African NOUs**: Burkina Faso, the Democratic Republic of the Congo, Egypt, the Gambia, Nigeria, Senegal, Sudan, and Tunisia

- **UNIDO experience**: more than 1,000 projects under MP regime, vast experience in Africa
KIGALI AMENDMENT: VIENNA TALKS

Where the data comes from:

• **pre-event survey**: June 2017 survey among A5 countries NOUs and experts

• summarizes results from **UNIDO Vienna Talks & special workshop on A5 countries** held 13-15 June 2017 in Vienna

• 75 participants from 55 countries
AFRICA’S CHALLENGES & OPPORTUNITIES

• CHALLENGES:
  • only few African countries have a RAC manufacturing sector or refrigerant production = mostly reliance on the import of RAC equipment from outside the continent
  • the import of second-hand or pre-charged equipment with high-GWP refrigerants can represent a challenge

• OPPORTUNITIES
  • RAC associations and training institutes are available in most countries
  • = stable basis for raising the skills level of the RAC sector and policy makers, but also to increase the cooperation between different stakeholder groups needed for the full success of KA implementation
AFRICA’S NEEDS FOR THE KIGALI AMENDMENT

• IMPACT OF THE KA ON AFRICAN COUNTRIES

• PRIORITY NEEDS FOR NATIONAL OZONE UNITS

• DIFFICULTIES IN THE KA RATIFICATION

• CAPACITY BUILDING FOR POLICY MAKERS

• DIFFICULTIES IN SETTING UP THE INSTITUTIONAL FRAMEWORK
KA will affect Africa on policy landscape + economic growth

- KA’s impact on a country’s development will be manifold
- it is expected to strongly affect environmental performance, the type and quality of future products, economic growth, and the regulatory landscape
- in relation to other countries, African NOUs expect the KA to trigger even more partnerships with countries from the same region and South-South cooperation - partnerships are more important than for NOUs in other world regions

Legend: 1 = Very low impact 5 = Very high impact
Priority area #1: capacity building for policy makers

- capacity building for policy makers is the highest priority area where African NOUs need support first
- receiving more support on low-GWP substances and technologies is the 2nd priority
- partnerships with implementing agencies and international bodies are the 3rd priority
TOOLBOX: EFFECTIVE KA IMPLEMENTATION

- Carry out ODS alternatives surveys for data collection, monitoring and reporting requirements for HFCs
- Designate ministries, steering committees and national coordination mechanisms for implementation and compliance
- Increase synergies with energy and climate change policies and actors, cooperate with custom officials
- Assess current regulatory framework; adapt laws and regulations
- Extend ODS licensing and control system to cover HFCs
- Prioritize sectors and technologies for the HFC phase down
- Identify market barriers for low-GWP alternatives and foster dialogue with industry
- Increase work with national safety standards bodies to include MP-related questions
HFC CONTROL & LOW-GWP TECHNOLOGIES

- ODS ALTERNATIVES SURVEYS
- FAKE REFRIGERANTS
- LOW-GWP TECHNOLOGIES: COMPETITIVENESS
- LOW-GWP REFRIGERANTS: FAMILIARITY
- PRIORITY APPLICATION SECTORS
- AVAILABILITY OF LOW-GWP TECHNOLOGY
ODS ALTERNATIVES SURVEYS

... are a guideline and measurement tool for alternatives to HCFCs and high-GWP HFCs

- a large majority of HFC consumption comes from just three substances: R134a, R410A, R404A
- today, different methodologies to estimate production and consumption are used, often a top-down approach
- barriers: non-registration of technicians in RAC associations; lack of bookkeeping on non-ODS by importers and distributors; non-available survey documents in French; no traceability of HFCs across the value chain; suspicion in fear of taxation by industry; mix-up of HFCs by customs officers ...
Low-GWP technologies already competitive

- low-GWP technologies already competitive for:
  - environmental impact, energy efficiency and performance, for safety and reliability, and life cycle cost
- African NOUs show higher confidence in low-GWP solutions than their peers from other world regions = a positive basis for a fast transition

Legend: 1 = Low-GWP alternatives very weak 5 = Low-GWP alternatives very strong
Domestic refrigeration will see quick low-GWP switch

- R600a (isobutane) and R290 (propane) have the highest familiarity levels for low-GWP refrigerants among NOUs
- converting domestic refrigeration to low-GWP (mostly R600a) will be “rather easy”
- next promising sectors: residential A/C and commercial refrigeration
- priority sectors will require an active involvement of the final consumer to support the transition
TOOLBOX: LEGISLATIVE, POLICY & ECONOMIC OPTIONS TO CONTROL HFCS

Legislative, policy & economic options to control HFCs

- Monitoring / control: HFC import quotas, licensing system, permits
- HFC restrictions: record-keeping on HFC use, logbooks, strict servicing cycles for F-gas equipment
- Economic: incentive schemes per industry sector (e.g. direct subsidies, tax returns)
- Monitoring / control: product and refrigerants labeling
- HFC emissions prevention: mandatory leak checks, penalties for illegal venting, obligatory refrigerant recovery
- Economic: replacement schemes for consumers (e.g. change of old refrigerators to new ones)
- HFC restrictions: phase-down schedule or bans for selected application sectors
- Economic: HFC taxes or deposit schemes based on GWP equivalent of substance
- Economic: minimum energy performance standards (MEPS) for new technology with lower direct and indirect GHG emissions
TRAINING, CAPACITY BUILDING & STANDARDS

• TRAINING OF RAC SERVICING SECTOR
• UNIFORM TRAINING STANDARDS
• CERTIFICATION
• SAFETY & ENERGY EFFICIENCY STANDARDS
• PROGRESS ON STANDARDIZATION
• BARRIERS TO STANDARDS FOR LOW-GWP TECHNOLOGIES
Training of RAC servicing sector of highest concern

• **problem**: lack of appropriate technical skills among the RAC servicing sector endangers human health, prevents faster market uptake, risks leakage of refrigerants, and impedes energy-efficient operation of RAC equipment

• **situation**: African countries have started industry dialogue or awareness-raising among industry, but there is more need for hands-on practical training or inclusion of HFC-related content in university curricula
TOOLBOX: TRAINING & CERTIFICATION

- **Train-the-trainers** schemes to establish a cascading system of highest qualified senior technicians to train medium- and junior-level staff

- **Universal RAC training kit** with pre- and post-assessment of training and checklists, minimum teacher qualification and equipment, venue requirements for theoretical and practical training, text books, manuals, etc.

- **Smartphone applications** for technicians for onsite handling of flammable, toxic refrigerants

- **Refrigerants driver’s license**: globally recognised minimum qualification scheme for sound refrigerant management

- **Refrigerant literacy course**: for non-technical people, such as NOUs, energy efficiency or climate change-related personnel to interact with technical staff

- **Use of labels with pictograms** on RAC equipment and cylinders to involve illiterate technicians

- **Technology exhibitions & pilot conversions**: use policy and technology capacity for a faster adoption of alternative refrigerant technology in real-life applications

- **Study tours** to neighboring countries, case study sites, training institutes and exhibitions in other countries
Standards important, but more progress is needed

• **problem**: without proper safety and energy efficiency standards the use of flammable or toxic low-GWP substances is not effective or safe

• **situation**: African countries see standardization as a matter of high urgency and importance, BUT most areas lack sufficient progress

• in some countries no national standardization bodies are available or too weak

• **solution**: create and strengthen national standardization bodies + engage in international standardization activities (TEAP task force)
ENERGY EFFICIENCY

• ENERGY EFFICIENCY AS A KEY PILLAR OF KIGALI AMENDMENT

• EXISTING BASIS TO BUILD ON IN AFRICA

• HOW TO SAVE ENERGY IN RAC EQUIPMENT

• EE INITIATIVES IN AFRICA

• EE FINANCES UNDER THE KA
Energy efficiency a main pillar of Kigali Amendment

• **situation**: energy efficiency is at the heart of the KA, in addition to phasing down high-GWP HFCs

• **situation**: energy efficiency is at the heart of three Sustainable Development Goals: SDG 7 on affordable and clean energy, SDG 9 on industry and innovation, SDG 13 on climate change
How to save energy in RAC equipment

- Awareness & knowledge
  - Information campaigns, stakeholder involvement, ...
- Training
  - Skilled contractors, installers, servicing staff, end users / operators, ...
- Technology availability
- Legislation
  - Environmental, EE or renewable energies, laws and targets, ...

- Renewable Energies
- Installation / Maintenance
- Insulation
- Process*
- Components
- Refrigerant

- Financing options & incentive schemes
  - Subsidies, tax reliefs, consumer incentives, equipment exchange schemes, ESCOs, ...
- Checks, labels & reporting
  - Monitoring, reporting, verification (MRV) tools for product efficiency, EE product databases, national reporting, energy labels, ...
- Standards
  - Minimum Energy Efficiency Standards, MEPs, ...

* = use of new RAC processes like CO2 transcritical cycle, absorption, adsorption and others
PARTNERSHIPS

- IMPORTANCE OF THE PRIVATE SECTOR & PROGRESS ON PUBLIC-PRIVATE PARTNERSHIPS
- SOUTH-SOUTH COOPERATION
- REGIONAL TWINNING
- BILATERAL PARTNERSHIPS & UN AGENCIES
Private sector key for KA, but partnership with policy makers needs more efforts

- **problem**: without proper involvement of different stakeholder groups the KA implementation will not be smooth or fully effective

- **situation**: African NOUs agree that partnerships are very important
- governments today have best relationships with training institutes and the RAC servicing sector
- BUT they would need stronger cooperation with the end-users of RAC units
TOOLBOX: PARTNERSHIPS & COOPERATION

- **Intragovernmental cooperation** to streamline available expertise on energy, climate, agriculture, urban development, health, etc.

- **Twinning** between cities, regions or nations to exchange knowledge and move forward faster

- **Partnerships with implementing agencies** as neutral brokers with expertise in maintaining cooperation and investment schemes in various industry sectors

- **Use of innovative financing schemes** to fully exploit available resources for industrial development, energy efficiency, climate change, etc.

- **SME innovation programmes** to increase the competitiveness of small enterprises especially in the R&I import, manufacturing and servicing sectors

- **Bilateral agreements** between importing and exporting countries on state of the art refrigerants and technology

- **Regional meetings, exhibitions, study tours, exchange forums** to gather policy makers, NGOs, academia, industry and civil society for KA matters
SOCIO-ECONOMIC EFFECTS & GENDER BALANCE

- SUSTAINABLE DEVELOPMENT GOALS & THE KA
- ROLE OF WOMEN AND THE YOUTH IN RAC INDUSTRY GROWTH
Green economy transition & RAC sector depends on involvement of women and the youth

- **problem**: although women make enormous contributions to economic growth, they are underrepresented in most industry sectors
- the RAC sector will grow rapidly in the next decades and already now lacks workforce

- **situation**: women, youth and disadvantaged communities need to be involved in green economy transition and in a growing RAC sector

- **solution**: school promotional campaigns; awareness-raising and “rebranding” for RAC professions; lifelong learning programmes; industry working groups for women
TAKE-AWAY MESSAGES

Africa expects the KA to have a decisive impact on its economic growth, the regulatory landscape, and the compatibility of standards with other countries.

Information on financial support sources and on the combination of KA with energy- and climate change-related matters is needed, as is more data on the availability and suitability of low- or zero-GWP technologies per application sector.

However, most African countries can build on existing infrastructure with RAC associations and training institutes established in 30 years of HCFC phase-out.

Partnerships with other countries in the region, South-South cooperation and partnerships with implementing agencies will be key to use available expertise for a smooth and effective KA implementation.
DIRECT VERSUS INDIRECT EMISSIONS

Production of appliances (first fill) → Manufacture emissions

Stock (= appliances in use) → Bank

In-use emissions (refill)

Disposal emissions

Energy consumption

Fill → Refill

Direct emissions

Indirect emissions

DEMAND

TOTAL EMISSIONS