Organised by:

Report of the Regional Conference on Better Air Quality in Sub-Saharan African Cities: 25 – 28 July 2006, UNEP Headquarters, Nairobi, Kenya

The conference on Better Air Quality in Sub-Saharan African Cities (BAQ-SSA 2006) was supported by the Air Pollution Information Network for Africa (APINA), Stockholm Environment Institute (SEI), World Bank's Clean Air Initiative in Sub-Saharan African Cities (CAI-SSA), United Nations Environment Programme (UNEP), United States Environment Protection Agency (USEPA), United States Agency for International Development (USAID), Swedish International Development Cooperation Agency (SIDA) and the International Atomic Energy Agency (IAEA).

Training Session – 25 and 26 July 2006

1. The training was opened by the session moderator, Dieter Schwela of SEI. He welcomed participants to the training segment of the BAQ-SSA 2006 and gave an overview of the objectives of the session.
2. Gary Haq of SEI gave an introduction to Air Quality Management (AQM). He discussed the challenges of urban air pollution, key drivers and impacts of air pollution, and the objectives and components of an AQM system.
3. Following his presentation, the issue of the costs associated with maintaining an Air Emission Inventory for cities (and countries) was posed. It was noted that creation of emission inventories can be expensive, especially when other priorities compete for this same funding. However, there were other ways of creating estimates (such as using emission factors) that could work as stop-gap measures.
4. The concern of old vehicle importation to African countries was also raised. It was observed that there was not enough technological and/or administrative capacity to monitor and enforce emission qualities of these vehicles. This concern was a reoccurring matter at the conference, with some proposals suggested, such as limiting the age of vehicle imports.
5. National versus local air quality priorities was posed as a possible dilemma. This was important due to the trans-boundary nature of air pollution.
6. Patrick Kinney from Columbia University gave a presentation on the health impacts of major air pollutants. It was noted that there are lots of data and public health studies available, however these were mainly based on developed world experience and were not always transferable to the developing world situation. These studies were generally cross-sectoral or timeline epidemiological studies and there was much information on the effects of PM and ozone.
7. It was observed that lack of information on the cause and effect of air pollution could make the creation of air quality standards difficult. Monitoring was required to see how air quality improves with the implementation of an AQM programme. It was noted that a lot of times WHO data was more general and could be used for these purposes.

8. Dieter Schwela made a presentation on the environmental impacts of major air pollutants. These impacts include: diminished visibility; soil and water acidity; climate change; rain and water changes; damage to vegetation and agriculture; damage and fouling of buildings and man-made structures. He noted that rural versus urban impacts are likely to be different and may well a have differing magnitudes. He observed that this was a multi-factored issue that could change due to various external factors, for example: acid rains in the Congo have largely subsided due to the diminished economic and industrial activities caused by war, but now there was an increase again with the growth of the local artisan sector.
9. Desta Mebratu of UNEP gave a presentation on the legal frameworks and regulatory regimes for AQM. His presentation covered the need for policy and legal framework, the strategic approach and policy and regulatory instruments that can be used in AQM.
10. Bjarne Sivertsen of Norwegian Institute for Air Research (NILU) made a presentation on ambient air quality monitoring. Some of the questions when designing an air quality monitoring programme included: – what is to be measured, where to measure, what to measure, how to measure, how to store the data and how to present the data. Issues to be included in the monitoring programme are: – source mixtures (local, area and regional sources), spatial differences, annual/diurnal variations, wind factors and impacts of air pollution.
11. Imoh Obioh from Obafemi Awolowo University, Ile-Ife, Nigeria made two presentations. The first on sources of air pollution and the second on emission inventories. He noted that urban pollution sources were a combination of point, line, and area sources from fossil fuel combustion, waste management, industrial processes, road transport and residential burning. Issues to be considered in emission inventory included the relationship between emissions and impacts, components of AQM activities, concept of emission inventory, fundamentals and procedures of emission inventory. He observed that the establishment of an AQM system demands the following range of information:
    - Good emissions estimates for all major pollutants (temporally/spatially) from point, line and area sources in a locality;
    - The determination of the resulting air quality from quantified emissions from point/line/area source at a particular location or from combined sources in a locality;
    - The impacts of subsisting ambient air quality on human health and ecology (flora and fauna species, and ecosystem);
    - The level of reduction on emissions needed to reduce ambient air quality to apparently safe limits.
12. Bjarne then gave a lecture on air quality modeling. He noted that dispersion models aimed at linking air pollution to air quality. These models included spatial distribution of pollutants concentrations, source contribution quantification, effects of suggested measures, exposure estimates and forecasting. He went on to expound on the various types of models.
13. Sara Terry from USEPA made two presentations. The first was on presenting data to decision makers and the public. She noted that it was important to make data meaningful to decision makers and to the public. It was therefore necessary to present data with the goal in mind. She talked on the need to involve the public in

AQM for better decision-making. She noted that the evaluation of public outreach/involvement was often difficult. How can one estimate this? Generally, a good indicator was if the original decision/ path to be taken was changed after public participation; another measure was public support for a decision and how the public feels towards the local Environment Branch.

14. She further noted that at times, positions of environmental agencies and the populace seemed to be diametrically opposed to each other. For example, the environment agency may want a farmer to get rid of his old polluting vehicle and the farmer doesn't want to give up his car. At first glance there seems to be an impasse, however, the farmer wants a car to get his products to market and the environment agency isn't against the car but the fact that it pollutes – with this in mind, a solution is much easier to come about.
15. Dieter made a presentation on the development of control strategies for mobile and fixed sources. He noted that information/data was needed to determine which sectors/ activities were the main contributors to air pollution in a city. This data was often not available, how could one then proceed? While accurate data was often expensive and difficult to come by, or simply not available, the use of emission inventories to make estimates could be just as useful. For example, the number of vehicles could be obtained from the vehicles' registry, their average engine displacement and hence emissions per Km driven, and so on – an approximate scenario could then be analyzed. Also, some situations/ vehicles were so polluting that a visual check of the pollution would be sufficient to see which vehicles to act on. The other matter to consider in developing control strategies was the quality of roads, or a "road roughness index". In Africa, the roads were often very bumpy, resulting in poor fuel efficiency and increase of emissions.
16. During the debate, it was pointed out that one of the initial ways to approach air pollution control was often the "polluter-pays" principle. In Africa however, this was open to abuse as it was difficult to ascertain the actual levels of pollution and enforcement was plagued by corruption and lack of capacity. At present it was the public that pays for the pollution through poor health and damage to the common environment. It was therefore important to start somewhere and not wait for perfect data.
17. The issue of fuel sulphur levels being high in Africa was raised. It was noted that sulphur levels in fuel was dependant on the grade and quality of the fuel imported. Many of the African countries imported crude and fuel from the Middle East that contained higher levels of sulphur. However the blending of various grades and standards determine the actual sulphur content. Countries such as South Africa had improved their refining capacities and are thus able to produce lower sulphur fuels. Other countries had sweet crude (Nigeria, Tunisia) and as a result lower sulphur content in their fuels.
18. Participants then went into two break-out sessions to further discuss the key issues, challenges and possible solutions to address AQM. Below is a summary of the main **challenges** identified by the two groups:
    - There is need for standardization of air quality information so that comparisons can be made – what is the measure stick and standard procedure to be followed. This information would then be shared among countries.
    - There is need to have a multi-sectoral approach to air quality as AQM is not only an environmental issue.

- There is need to start developing and implementing actions now as the state of air quality and effects are generally known and thus no need to wait for detailed results to commence implementation of AQM.
- There is need to strengthen health care providers as prevention of diseases relating to air pollution is more cost effective than treatment. Prevention is also given low priority.
- There is need to use economic instruments to support AQM.
- There is lack of awareness and proper communication strategy (to the public and decision makers) on the impacts of air pollution. This is compounded by poverty that leads to poor environmental choices.
- There is need for sustainability of AQM projects as a lot of times these are one-off efforts with no continuation and follow-up.
- Restriction of old vehicle importation – these are often vehicles that are not permitted to operate in their countries of origin because of poor environmental performance.
- The region suffers from poor infrastructure, poor traffic management and congestion.
- There is lack of policy, regulations and enforcement capacity on vehicles standards.
- The quality of fuel used in the region is poor and/or adulterated.
- The region lacks technical capacity (including data) and financial resources.
- There is a general lack of commitment from stakeholders.
- Burning of waste is another contributing factor to air pollution in the region.

19. The **recommendations** proposed during the breakout sessions are summarized below:
    - There is need to develop legislation and standards on air quality including enforcement.
    - It is important to develop control and enforcement capacities and strategies.
    - There is need to establish continuous air quality monitoring techniques.
    - It is important to involve and sensitize the public and policy makers on the need to address air quality. Environmental education should cover all stakeholders.
    - A carrot and stick approach to environmental matters should be explored. Right now there are too many sticks and not enough incentives for individuals or companies to take care of the environment.
    - There is need for a fully integrated framework to combat air pollution.
    - It is necessary to include land use- zoning of cities in AQM.
    - It is important to adopt a harmonization approach to AQM in Africa (as air pollution is often trans-boundary). There is also need to develop action plans and pilot projects (including a communication strategy) on sub-regional regional level.
    - It is necessary to include better public transport and dedicated lanes for buses, better waste management/ control in AQM.
    - It is important to review tax and duty incentives to reduce the number of old vehicles and encourage import/use of new vehicles.
    - Vehicle infrastructure needs to be upgraded to handle the current and future volume of traffic.

Policy Session – Day 1 Wednesday 26 July 2006

20. Kilaparti Ramakrishna, the Deputy Director of the Division of Policy Development and Law, UNEP, welcomed participants to the Policy Session of the BAQ-SSA 2006 Conference. He explained that the outcomes of the training session could be used as input for the policy session and that the outcomes of the policy session would in turn be inputs to the ministerial session on Friday. He pointed out that the main concerns facing air quality issues was how to bring the need for air quality management to the attention of the public and decision makers, and how to package air quality in a way that makes the urgency of the issue clear. Linking air quality to broader economic development and health issues was a starting point.
21. He went further to say that the objective of the session was to come up with suggestions for concrete actions, recommend priority actions to be taken and propose ways that policy makers could contribute towards informing and supporting decision makers address air quality. These recommendations would form the basis for the Ministerial discussions on Friday, 28 July 2006. He noted that it was often said that in Africa it was difficult to work on air quality issues because there were so many competing issues, like poverty, HIV Aids, and that it was difficult to get finances allocated on air quality issues. He further noted that from his experience, if we made a clear case for air quality issues and we presented them well to both the politicians and the public at large, concrete targets could be set and change observed in the region. He gave the example of the successful campaign to phase out leaded petrol from Sub Saharan Africa.
22. He pointed to key priority areas that needed to be discussed, such as improved information, though this should not deter action, cleaner fuels, cleaner vehicles, industrial waste, waste burning and indoor air pollution. It was important to make sectoral linkages especially to health and development and also global linkages. It was also necessary to work in partnerships.
23. Luc Gnacadja, former Environment Minister of Benin and moderator of the policy session, reviewed the interesting outcomes of the training sessions and concluded by saying that these outcomes were quite broad and needed to be sharpened during the policy session. The goal of the policy session was to develop a framework for action to be discussed during the ministerial session. He also stated that 'air pollution is a silent assassination of the weak.'
24. Stephen Simukanga of APINA delivered the keynote presentation on air quality issues in Africa. He gave an overview of the different air quality trends and pollution sources in Africa. He reflected briefly on the Better Air Quality conference of 2004 in South Africa and was pleased to see the growth in participating countries since then. He emphasized the need for capacity in air quality management and the opportunities available to develop air quality institutions in African countries.
25. He said that urban air quality in Africa had deteriorated in most urban areas due to rapid increase in urbanization, motorization and economic activity. Urban air pollution posed a significant threat to human health, the environment and the quality of life of millions of people throughout the world. He pointed out that an estimated one billion people were exposed to outdoor air exceeding maximum

recommended levels world-wide and that approximately 800,000 premature deaths were due to urban air pollution every year (WHO, 2002, 2005).

26. He discussed the various sources of pollution, health and environmental effects (from household level to global impacts), challenges in Africa and on-going initiatives to address urban air quality. Some of the challenges he identified included: low monitoring and assessment capacity in the region; lack of standardized emission inventory at urban and regional levels, so that approaches to AQM were compatible; poor modeling of pollutant transport and deposition for impact assessment at urban and regional levels and lack of harmonized monitoring procedures and campaigns across Africa.
27. He concluded by stating that unlike some of the other major problems in the region, there was a high chance that air pollution problems could be solved if preventive measures were put in place early before air pollution got out of hand. There was need therefore, to support the various initiatives aimed at tackling air pollution problems in Africa. Furthermore, Africa should learn from the lessons from developed countries on how the urban air pollution issues were tackled. Developing regional/international agreements on air pollution would be one way to proceed.

Session I – Assessment and Monitoring

28. Sara Terry of USEPA highlighted the need and types of assessment and monitoring of air quality. She emphasized that there was still a lack of data in many countries, which often meant a lack of action. But even where data was available it was often not disseminated and used. Sharing information on emissions, pollutants, and the impact of air pollution on health as well as building a network around these issues among (local) stakeholders, cities, and countries was very important.
29. She observed that there was need for air quality data in SSA because the region had the highest rate of unplanned urbanization leading to air quality deterioration. This had significant health impact, especially for children. She noted that Quality Assurance/Quality Control was the foundation for any AQM program. There was need to assess air quality to establish baseline data, which would form the basis for an AQM strategy and for determination of compliance. There was also need to continuously assess monitoring goals and to present the data to both the public and decision makers in a meaningful manner.
30. During discussions, the following observations were made:

- <u>Health</u>

- When measuring blood lead levels (especially in children), various sources of lead (including paint, mining, and fuel) should be taken into account (leaded paint in Cameroon and mining in Nigeria were given as examples). The World Health Organization's publications on lead have additional information on various sources of lead pollution.
- Beside pollution from vehicles, biomass – frequently used in poor countries- also contributes heavily to indoor and outdoor air pollution.

- Public awareness

- Public awareness should be at the top of the agenda, as public education on health and environment impacts of air pollution is key in collecting support for air quality policies.
- It was stressed that the private sector, together with government, should take responsibility for its contribution to air pollution and that the polluter pays principle was not adequately applied in Africa.

- Assessment and Monitoring

- The question of air quality monitoring quality control and data quality was raised. Dieter Schwela of SEI stressed that data of known quality was the minimum that needed to be achieved, otherwise conclusions made with incorrect monitoring data could lead to incorrect/irrelevant policies. This also meant a program of continued measurement training.
- Air quality and health information was available for Africa in 'gray data' (academic papers and research). However, existing information was not effectively shared or used by policy makers and politicians as it often did not reach them or was not presented in understandable or useable form.

31. Esi Nana Nerquaye-Tetteh of the Ghana Environmental Protection Agency made a presentation on the case of Accra, Ghana. The USEPA, USAID and UNEP in July 2004, selected Accra, Ghana as one of two cities in Africa to benefit from an Air Quality Monitoring Capacity Building Project. The aim of the project was to build and establish local capacity on air quality monitoring; collect and analyze air quality data on key pollutants over a period of one year; provide policy-makers with information on the air quality in Accra and its impacts on health; formulate a basis to further develop an air quality management strategy for the abatement of air pollution in Accra; and provide recommendations on next steps in developing a broad base air quality program for Ghana.
32. She observed that the major sources of ambient air pollution were vehicular exhaust emissions - the largest emitters being older vehicles, emissions from industrial sources, open burning of waste and other materials, road and wind blown dust and the dry harmattan winds. The findings of the project showed that roadside locations and commercial sites had high levels of particulates. This could be attributed to road dust, wind blown dust and vehicular exhaust emissions. Lead and manganese did not seem to be a major issue in Accra's ambient air quality. Low SO2 concentration measured at the roadside locations despite the heavy vehicular traffic at these sites could be attributed to the low sulphur content of the crude oil used by Tema Oil Refinery.
33. This concrete presentation generated a lot of interest from participants. A follow-up study in partnership with Harvard University will seek to characterize health impacts air pollution more clearly in the city.
34. A cost estimate of $110,000 for the Accra project was given, but this did not include the USEPA's in-kind contributions (i.e. staff expertise). Dieter Schwela mentioned that cost-effective rapid inventory/air quality assessment technology was available in addition to the more expensive options mentioned in Ghana's presentation. Countries requested that the Accra example be made available in a handbook for other cities to use – including details on steps taken, technology used,

and costs. Ghana's proactive approach to air quality in Accra, including seeking partners for funding and implementation, showed that the unavailability of funds should not be an impediment to action for air quality.

35. Participants then discussed the following **challenges, recommendations and next steps** for assessment and monitoring in Sub-Saharan Africa:

Challenges

- Information

- Information should be shared freely between countries and standardized for more effective comparison (including standard monitoring procedures, data collection, targets).
- Information must be made relevant to decision-makers - data must be interpreted and communicated effectively. The supply of information must meet the demand from decision-makers. Strategies on how to best reach policymakers across sectors and in finance are needed.
- Public awareness of air quality problems and measures are needed so that measures and implementation costs are embraced.
- Quantifying health impacts of air pollution will help make the case for more government resources, and also help the public in understanding policy measures to curb pollution.
- Waste burning and road dust need to be included in measurements and addressed.

- Resources

- Resources for air quality management must be mobilized nationally
- Economic instruments and incentives need to be used to encourage cleaner air; hand-in-hand with sound cost-benefit analyses of air quality policies and measures.
- African countries pioneering air quality research could also develop new markets for air quality monitoring expertise and technology.
- Air quality projects must be designed so as to be sustainable - too often air quality measuring activities are one-off efforts with no continuation or follow-up.

- Political & Institutional framework

- Air quality is a developmental problem, such as HIV/AIDS, which threatens our very existence and should be addressed as such.
- A multi-sectoral approach is needed that reaches far beyond environment ministries - for example, ministries of health and health officials should be included.
- Disease prevention institutions must be strengthened and emphasis put on prevention rather than treatment - information for healthcare workers on air quality and health is needed.

Recommendations and Next Steps

- Information

- There are actions that can be undertaken now to improve air quality and influence decisions - even where air quality management systems and policies are not yet in place and monitoring not yet completed. Action can be taken with existing measurements; vehicular and industrial pollution are already recognized as harmful to health and studies performed in other regions and countries can be used until local information is available. Rough data can be adequate to give policymakers a good idea of the air pollution problem.
- Data on air pollution should not only display air concentrations of certain pollutants; rather, health indicators should be attached to give these numbers meaning.
- Countries requested that the Accra, Ghana air quality monitoring project's details be made available in a handbook for other cities to use – including detailed information on steps taken, technology used and costs.
- Experts, politicians and the public do not speak the same language. Communication on air quality should be adapted according to the target group. Air quality issues, including the link between high sulphur fuels and emissions of fine particulate matter, should be communicated in a clear language that explains the causes, impacts, and consequences.
- Information on assessment projects undertaken in the region should be compiled and an overview created of African air quality projects.
- Clear cost-benefit information on air quality, health and economic growth must be compiled and used.
- A pro-active attitude is needed from researchers, experts and policy makers to collect relevant information and develop projects addressing air quality.

- Resources

- Most countries in SSA can meet the necessary investments for air quality monitoring activities.
- AQM needs improved technical capacity and resource allocation in Africa.
- A shift to the polluter pays principle is necessary.
- Any existing data on air quality and health effects should be pulled out of storage and used.

- Multi-sectoral approach and Partnership

- Air quality should be integrated with urban planning (residential areas-industrial areas).
- Multi-sectoral urban environment units should be established within ministries.
- Alternatives should be provided to policies that may affect economic development and income. For example, limits on older cars and biomass for indoor cooking should be accompanied by alternatives, including improved mass transport choices and access to cleaner burning cooking fuel (such as natural gas).

- Political & Institutional framework

- Build on the successful experience of lead phase-out in Sub-Saharan Africa - a regional consensus and strategy followed by national-level action can be applied to issues such as used car imports, catalytic converters and sulphur levels in fuels.
- A regional approach should be used for issues of mutual concern - such as the importation of older vehicles, catalytic converters, and sulphur levels in fuels. Countries can build on regional consensus to set their own standards. Common strategies should be developed for common sources of pollution.
- Better vehicle inspection and maintenance systems must be developed.
- There is a need to ensure that vehicles imported into SSA are equipped with running catalytic converters.
- Political will to address air quality must be cultivated.
- Involvement of regional forums, including the African Union, the East African Community (EAC), and the African Ministerial Conference on the Environment (AMCEN), is needed to ensure attention and action in the field of air quality. Successful regional agreements on trans-boundary air pollution should be used as guides in Africa.
- African countries should network more effectively on air quality issues.

Day 2 Thursday 27 July 2006

36. Luc Gnacadja, the conference moderator, observed that air pollution in Africa is often addressed in a sectoral manner, however this ought to change to inter-sectoral. He added that air pollution was not yet seen as a real threat, hence the need to learn more, including best practices and for public sensitization. He added that there was need for air quality standards and regulations not only at national level but also regional level. These regulations would also concern importation and maintenance of cars.

Session II – Mobile Sources

37. Tsietsi Mahema of the Department of Environmental Affairs and Tourism in South Africa made a presentation on mobile sources of air pollution. He observed that vehicles were a primary source of harmful pollutants in the region and that countries -on a sub-regional level -must agree to tackle vehicle emissions through simultaneously improving fuel quality and vehicle technology: the so-called "Systems Approach". He pointed out some of the challenges to this, including differing national priorities, lack of sufficient funding and other assistance from government, and inadequate technical and financial assistance from developed countries. He pinpointed the two priority areas to address mobile sources pollution as sulphur content in fuels and Lead Replacement Additives.
38. Participants then went into three break-out sessions to further discuss the key issues, challenges and possible solutions in addressing pollution from mobile sources. Below is a summary of the interventions and discussions by the three groups.
39. **Break-out Group 1 – Transport and Urban Planning**: The session was moderated by Gary Haq of SEI. The following presentations were made:

- David Oliver from the City of Cape Town, South Africa gave a brief overview of the transport situation in Cape Town. He noted that rapid urbanization had led to transport problems. South Africa was hosting the Football World Cup in 2010 and this was resulting in the issue of sustainable transport systems being addressed in Johannesburg and Cape Town through proposals of bus transit systems, road safety, traffic flow, cost-effectiveness and air quality.
- Lew Fulton of the Division of GEF Coordination, UNEP combined the Dar es Salaam Rapid Transit Project and the GEF funding mechanism in the field of transport and energy. He started with quoting the former mayor of Bogota, Colombia, Henrique Penalosa, who asked the question: 'In what kind of city do we want to live?' The answer was very important for the way we designed our cities, neighbourhoods, infrastructure and roads. If we wanted to move people and not cars, we had to plan our cities differently to make walking and cycling safer and to promote public transport, such as Bus Rapid Transit (BRT) systems. BRT was a very cost effective means of transport, since it could move many people (150) at once over a special constructed bus lane. The fare was comparable with one of a minibus and the buses were clean, since they implemented the latest technology. In Bogota the BRT had proved to be very successful. Other cities like Dar es Salaam, Cape Town, Accra and Jakarta were in the process of introducing this type of mass transit system.
- Jürgen Heyen-Perschon of the Institute for Transportation and Development Policy (ITDP) focused on non-motorised transportation and made clear that in Africa only 3-4% of the people own a bicycle (compared to 50% in China) mainly due to unsafe roads and lack of facilities for bicycles. The city of Bogota re-designed its city, made it friendlier for pedestrians and cyclists, and the use of bicycles use went up from 0.3 to 4.4%. It was very important how we designed our city, neighbourhoods, infrastructure and roads.
- The following **challenges** and **recommendations** were discussed:

  <u>Challenges</u>
  - political and public awareness (change of attitude)
  - land use planning
  - road safety; better roads
  - encourage non-motorised transportation
  - higher occupancy of cars
  - poverty aspect of non-motorised transportation
  - environmental assessment
  - outlining the cost/benefits of non-motorised transportation /less cars
  - protection of natural resources

  <u>Recommendations</u>
  - development aid should support better urban planning; urban sustainability
  - investments in mass transit systems
  - communicate best practices; organize study tours
  - undertake/highlight cost effective studies
  - better traffic zoning
  - sensitize the mass; public awareness to reduce car use

- higher taxing of car use, but at the same time providing alternative means of transport
- integrate transport, but also non-motorised transportation in other policy areas (energy, health, poverty, planning)
- build capacity at local level in the field of transport, non-motorised transportation, urban planning
- relate transport to poverty alleviation
- promote affordable and accessible public transport
- involve media and civil society

40. **Break-out Group 2 – Promoting Cleaner Fuels:** The session was moderated by Eleodoro Mayorga Alba from the Policy Division, IBRD Oil, Gas & Mining of the World Bank. He reflected on the positive outcomes of the joint efforts of various partners in the campaign to phase-out leaded petrol in SSA, and how countries could build on the fuels and vehicles systems approach to further improve and harmonize fuel standards. The benefits of harmonization of fuel standards through a multi-stakeholder process included increased trade, limited fuel adulteration, and investment economies of scale for cleaner fuel and vehicle technology. He emphasized that fuel improvements cannot end with lead phase-out, and should move forward in a harmonized, sub-regional approach. The following presentations were made:

- Rob Cox of the International Petroleum Industry Environmental Conservation Association (IPIECA) presented on the decommissioning of tetra-ethyl lead (TEL) facilities in Africa as follow up to the phase-out of leaded gasoline. TEL was still found in terminals and refineries around the world and posed a public health risk if its storage and disposal was not properly undertaken. There were currently no standards or guidelines in place in Africa to make TEL facilities safe, including provision for storage tanks and pipe work, therefore making the lead phase-out process in SSA incomplete. Theft and misuse of TEL facilities was common, including use of tanks for water storage. Illegal and inappropriate disposal was also a problem. IPIECA proposed to begin developing guidelines to encourage national legislation on this issue. The moderator proposed that IPIECA develop the draft guidelines, and that a technical panel be set up to look at the final draft of the guidelines and encourage their adoption by intergovernmental mechanisms. The draft will be available by the end of 2006.
- Godfrey Molo Yenwo of the African Refiners Association (ARA) presented on the outcomes of the ARA fuel specifications working group, recommending a systems approach to regional fuel harmonization whereby improvements in fuel quality were matched to improvements in vehicle technology. He emphasized that changes in fuel specifications were decisions to be taken by national governments in consultation with refiners and car manufacturers, taking into account the regional context. He noted that ARA was prepared to promote the extension of the leaded petrol phase-out to North Africa. He noted that a 50 parts-per-million (ppm) sulphur in fuels target may not be immediately feasible for countries in Africa with small, state-owned refineries and proposed that countries seek to lower sulphur in gasoline and diesel fuels according to the ARA-developed 'Afri-standards'. He explained the key technology-enabling sulphur thresholds in gasoline auto

technology as 1,000 ppm for traditional catalyst technology and 150 ppm for advanced catalysts and on-board diagnostic systems, and for diesel vehicles as 500 ppm (the upper limit for diesel oxidation catalysts), and 50 ppm as the upper limit for particle filters and other advanced technology.

- Rich Kassel of the Natural Resources Defense Council (NRDC) presented the systems approach used in the United States to improving fuel quality and lowering sulphur in fuels. He explained that 500 ppm sulphur was a key threshold in the systems approach to fuel and vehicle improvements, in that it enabled cleaner vehicle technology such as diesel oxidation catalysts to be used, significantly lowering emissions. Low-sulphur fuels provided proportionate emissions reductions from existing vehicles, and ultra-low sulphur (15 ppm or lower) fuel enabled the use of even more modern and effective emissions control technology on vehicles. Bus and truck retrofit projects required 500 ppm or lower fuel. He emphasized that the systems approach had been proven to provide benefits in air quality and vehicle maintenance that outweighed the costs of investment in cleaner fuel and vehicle technology. While he acknowledged the costs of fuel quality investments, studies showed that the incremental costs of fuels were only 1 to 2 US cents per liter when going from 3,000 ppm to 50 ppm sulphur in diesel. He proposed regional, sub-regional and national workshops to develop systems-based programs for cleaner fuels and vehicles, in combination with technical assistance and capacity building to help improve urban air quality.
- George Wachira of the Petroleum Institute of East Africa spoke of lessons learned in lead phase-out in East Africa, where the starting point was health concerns, and governments led the way. He explained that based on government initiative, the Kenya refinery designed an upgrading program which showed that incremental costs to lower sulphur levels to 500 ppm were not high. This program would take 4 years to complete. He recommended an initial step from current sulphur levels directly to 500 ppm sulphur in fuels (in particular diesel), and this lower level would then serve as the starting point for further investments to go to ultra-low sulphur.
- Participants discussed the development of an approach specific to the region, the economics of investing for low sulphur fuels, and problems specific to smaller, state-owned refineries in Africa which may affect incremental costs. UNEP recommended that the first 'Afri' goal for sulphur be agreed at the sub-regional level, followed by 'Afri-2' at 500 ppm, 'Afri-3' at 350 ppm, and 'Afri-4' at 50 ppm.
- The following **challenges** and **recommendations** were identified:

<u>Challenges</u>

- Lead Phase Out (LPO) is completed, however the dismantling of TEL (tetraethyl lead) facilities has not been executed in all the refineries. Procedures and industrial guidelines are required to proceed with the dismantling of these facilities.
- A system approach is required to continue, in a cost-effective manner, the improvement of fuels quality. This approach should take into account the SSA countries' economic situation and priorities and the car fleets and their evolution.
- Harmonization of fuel quality is desirable and has to be done before individual governments start adopting fuel specs after LPO. Harmonization should be

envisaged as a sub-regional process. Refinery configurations and crude oil feedstock are different in east, west and southern Africa.

Recommendations

- The guidelines that IPIECA and INNOSPEC are developing for the dismantling of TEL facilities should be revised by a technical expert group, and be adopted and promoted by the international organizations that cooperated in the LPO process.
- The proposed "fuel specification bands" (such as AFRI 1 to 4, presented by the Africa Refinery Association - ARA) for improving the current specifications, should consider the following steps:
    - The current fuel specifications.
    - The specifications that could be achieved without major refinery investments; in particular sulfur levels should be immediately reduced as much as possible with existing facilities. This could be different in each African sub-region.
    - The next step corresponds to the threshold of 500 ppm for max. sulfur content in diesel and gasoline, which is an important threshold for running modern vehicles with emission control technologies.
    - The 50 ppm level should remain as a longer term goal.
- To organize sub-regional meetings for multi-stakeholder groups (including government and regulatory standardization authorities, oil industry and civil society representatives, and international organizations) to prepare recommendations to governments on the time table including targets/levels to adopt new harmonized region-wide fuel specifications

41. **Break-out Group 3 – Promoting Cleaner Vehicles:** The session moderator was Rob de Jong of UNEP. The following presentations were made:

- Aminu Jalal of National Automotive Council, of Nigeria outlined three measures to reduce vehicle emissions in the region as using cleaner fuels, promoting cleaner vehicles and promoting the use of mass bus transit systems. He proposed the mandatory introduction of catalytic converters and restriction of the age for imported vehicles to 5-10 years. He also called for the phase out of 2-stroke engine motorcycles to be replaced with 4-stoke engine motorcycles and public sensitization as measure that could help reduce vehicle emissions.
- Stuart Rayner of Ford Motor Company of Southern Africa spoke on the various vehicle emission testing methods for both new and used vehicles entering SSA markets. He proposed the simple, low cost carbon monoxide (CO) tailpipe test for petrol engines on the effectiveness of catalytic converters. For diesel vehicles, he proposed the adoption and sustained enforcement of 'low cost' opacity requirements. He concluded by saying that SSA states/cities should be encouraged to adopt such measures as a first step to reducing visible smoke emissions.
- Paul Jonathan Martin, from the World Bank's Department of Environmental & Socially Sustainable Development in Africa, proposed that cities needed to target the worst polluters to succeed in improving air quality in their region. He outlined the following measures for success: stakeholder inclusion in planning, financial incentives such as import duty reduction for cleaner vehicles, addressing issue of 2-

stroke engine motorcycles, lower sulphur levels for diesel vehicles, introducing clean buses in most polluted urban areas and introduction of measures that do not depend on inspection.

- The following **challenges** and **recommendations** were identified:

  - There is a lack of information about the contribution of vehicles to urban air pollution. There is also need to focus policies on the key issues such as pollutants, modes of transport, diesel or petrol vehicles, motorcycles (4-stroke engine) etc.
  - All new and second hand vehicles imported in SSA should be equipped with catalytic converter that can reduce their emissions by 90%.
  - The number of motor cycles in many SSA countries is rapidly increasing - there is an urgent need to regulate them, especially 2-stroke motorcycles due to their particulate emissions. Only 4-stroke motorcycles should be allowed and 2-stroke ones should be better maintained and the right oils used.
  - There is an urgent need to improve diesel fuels - the sulphur level of diesel - to reduce the high PM emissions.
  - There is need to provide alternatives to "normal" vehicles - non-motorised transport, bus rapid transport systems, new clean technologies such as hybrids, etc.
  - Financial incentives should be used - like taxing the heavy polluting vehicles and giving tax incentives to cleaner vehicles and 4-stroke motorcycles.
  - Vehicles issues need to be addressed within the regional/ sub-regional context.
  - Legislation is needed on the import of second hand vehicles with maximum age limits set. There is also need for legislation on emission levels and technologies required (catalytic converters installed).
  - Inspection and maintenance are crucial. When these exist they are often not effectively implemented or enforced.
  - There is need to establish short - medium and long-term goals.

Session III – Stationary Sources

42. Sergio Margulis, from the World Bank's Department of Environmental & Socially Sustainable Development in Africa, made a presentation on stationary sources of air pollution. He asked whether air pollution was a major problem in African Cities. To answer this question he looked at the health impact of air pollution compared to other threats and at death rates caused by various diseases, like HIV/Aids and malaria. Furthermore he looked at the cost-effectiveness to improve air quality and finally he urged not only to focus on air pollution caused by vehicles, but also to look at stationary sources, especially because combating indoor pollution had very high cost effectiveness. A worldwide ranking of cities most affected by air pollution was questioned because many African cities did not have a (good) monitoring system yet.
43. Franck Bousquet, Manager of the World Bank's Clean Air Initiative in Sub-Saharan African Cities (CAI-SSA), presented the strategy and objectives of the next key phase of the Initiative "Emission Reduction thru Integrated Air Quality Management" to follow the Initiative earlier phase "Leaded Gasoline Phase-Out in

SSA". One of the primary goals of that next phase is to "design, implement and monitor concrete action plans to reduce urban air pollution". In the three pilot cities of Antananarivo, Cotonou and Ouagadougou, selected by the Trust Fund donors for Air Quality Management projects, such concrete action plans will be developed, through field monitoring of air pollution levels, identifying of sources and gathering of relevant information, designing of a simple air quality management model adapted to each city to assess the expected impacts, benefits and costs of proposed options, and building of a consensus on the selected management options

44. Participants then went into two break-out sessions to further discuss the key issues, challenges and possible solutions in addressing pollution from stationary sources. Below is a summary of the interventions and discussions by the two groups.
45. **Break-out Group 1 – Stationary Sources**: The session moderator was Rogerio Uthui of APINA. The following presentations were made:

- Chilekwa Kampeshi of Mopani Copper Mines Ltd gave the background of air pollution in the Zambian copper belt and Mopani's initiatives to reduce air pollution.
- Imoh Obioh of Obafemi Awolowo University, Nigeria, spoke on waste burning.
- The following **challenges and recommendations** were identified:

Challenges

- Lack of proper waste management that leads to waste burning and dump emissions.
- Weak law enforcement.
- Lack of willingness by companies/industries to invest in pollution control.
- Lack of public and stakeholder awareness / education and participation in the issue of stationary source emissions.
- No early warning pollution systems for public health.

Recommendations

- The creation of an integrated urban waste management system that also takes into account urban planning.
- Institute incentives for companies that control emissions via economic incentives such as tax breaks.
- Public education plan.
- A strong regulatory framework.
- An early warning system for pollution.
- Improved structures to encourage African industry CDM participation.
- Developing strategies to avoid the occurrence of waste.
- The use (and enforcement) of environmental audits, along with incentive structures to minimize impact on business competitiveness
- Governments to promote "Waste to Wealth":
    - Recycle
    - Electricity generation from landfill gas
    - Create more and better landfills for sanitary purposes.

46. **Break-out Group 2 – Households (incl. indoor air pollution)**: The session moderator was Dieter Schwela of SEI. The following presentations were made:

- Wilhemina Quaye of Ghana Enterprise Works spoke about the "Clean Energy for Households Cooking in Ghana" project. She concluded that the use of improved wood stoves to replace traditional wood stoves resulted in significant reductions in kitchen indoor air pollution concentrations. Twenty-four-hour PM2.5 levels inside the kitchens were reduced by 52% (from 650 to 320 ug/m3) while CO levels dropped by 40%.
- Sergio Margulis from the World Bank's Department of Environmental & Socially Sustainable Development in Africa stated that an estimated 396,000 deaths occur each year in SSA from indoor smoke. Some of the recommendations to address this included behavioral change, better ventilation, improved stoves and cleaner fuels.
- The following **challenges and recommendations** were identified:

Challenges

- Inability to upgrade our energy forms – moving up the energy ladder – mainly due to lack of financial resources rather than technology.
- How to make adoption of improved stoves sustainable.
- The limitations in the services provided by improved stoves compared to conventional stoves, which tend to be multipurpose.
- Developing and adopting alternatives to firewood.
- Access to funds to enable switch to cleaner fuels/ access to cleaner fuels.
- Social behaviour / customers' unwillingness to adopt new habits.
- Lack of awareness at public, media and political level on the impacts of indoor air pollution on health etc.
- Attention to other indoor air pollutants rather than just cooking and heating.
- Lack of access to appropriate housing.

Recommendations and way forward

- Implement suggestions made during the international world habitat summit – the World Urban Forum.
- Raise public awareness.
- Use better construction materials that take weather into account.
- Better architecture that considers environmental aspects.
- Promote private sector provision of improved stoves on a market basis.
- Identify cost-effective measures.
- Gather data on health effects and benefits of improved stoves compared to other measures.
- Integrate indoor air pollution issues into educational programs and curricula.
- Promote use of carbon finances as a sustainable subsidy measure to facilitate use of improved stoves and other measures.
- Empower rural communities to plant trees and understand the importance of using dry rather than wet wood.
- Involve all stakeholders in design and transfer of technologies.
- Promote alternatives to wood fuel.

Ministerial Session – Friday 28 July 2006

47. The Ministerial Session was chaired by Hon. Mark Mwandosya, Minister of Environment, Tanzania, and Hon. Thandie Shongwe, Minister of Environment, Swaziland. They welcomed Ministers from SSA to the session.
48. The session was opened by the Deputy Executive Director of UNEP, Mr. Shafqat Kakakhel. He spoke on the need to boost air quality in Africa's cities due to its health and environmental impacts. He pointed out the transport sector as the main contributor to outdoor air pollution and the burning of biomass and coal as the largest source of indoor air pollution. He emphasized partnerships to tackle pollution issues in the region.
49. The Kenyan Minister of Transport, Hon. Chirau Ali Mwakwere then gave the welcome speech. He welcomed colleagues to the country and regretted that the transport sector, a major pillar of economic recovery in Africa, was also the largest contributor to air pollution. He outlined some of the measures undertaken in the country to reduce vehicle pollution.
50. Luc Gnacadja, the Policy Session moderator, gave a brief summary of the discussions during policy session as input into the day's Ministerial discussions.
51. A panel consisting of Sergio Margulis (World Bank), Rob de Jong (UNEP), Sara Feresu (APINA), Dieter Schwela (SEI), David Oliver (Cape Town), Rob Cox (IPIECA) and Stuart Rayner (Ford Motor Company) was constituted to answer questions raised by the Ministers.
52. Ministers raised concerns and questions regarding the integration of AQM into the PRSP process at the national level (including mass transit service improvement in SSA), prevalence of 2-stroke engines, high sulphur fuels and preparation of standard as discussed below:

- Ministers were of the view that unless environment is linked to the PRSP process, the issue of air pollution would remain sidelined in the region. As such, an integrated approach was required focusing on education from grass roots, capacity building and implementation of best practices with the help of international and bilateral agencies including UNEP and the World Bank.
- Ministers highlighted the need to link air quality and health, economic, and social impacts on communities. Impacts of the various pollutants (including incinerators and particulate emissions from non-tarmac roads and construction activity) should be measured and cost estimates of poor air quality made. These should then feed into national and city budgetary discussions as one way to connect the importance of environmental services to economic growth.
- The suggestion was made that regional and/or national air agencies need to be created to oversee and coordinate such activities. The Ministers also emphasized the need to harmonize air pollution regulations in the regions and sub-regions since air pollution has trans-boundary effects.
- Ministers discussed the importance of urban planning and providing mass transit as a means of reducing air pollution in African cities.
- The significant rise in the popularity of 2-stroke motorbikes in West Africa was also mentioned, given that it is the favored mode of transport for poorer city inhabitants and creates employment opportunities. At the same time, these vehicles are heavy

polluters. Fortunately, there are ongoing projects through the World Bank and other agencies that address this issue.

- The importance of public participation and awareness was also stressed.
- Ministers noted that in many African countries and cities the extent of air pollution problems and the major sources have not been identified. As such, a study would be useful. Countries would then set goals for air quality and emission restrictions followed by an integrated legal framework which would be publicized to both industry and the public. Monitoring, enforcement and expertise were a requirement for the process to succeed. Furthermore, the greening of cities, the use of less polluting alternative energy sources and the education of the public is needed to fully achieve better air quality for city inhabitants.
- The importance of using low sulphur coal and fuels for electricity production was emphasized. Burkina Faso pointed out that 80 % of the electricity in the country is produced from thermal sources.
- The increased incorporation of air quality management measures into aid packages was identified as a way of addressing increased air pollution in African cities.

53. The following responses were given by the panel:

- Regarding the development of the second generation of the Poverty Reduction Strategy Papers (PRSP's) now underway, the panel explained that Ministries of Environment can translate available air quality data into policy measures and indicators, and work more closely with Ministries of Finance to assess impacts of poor air quality on national incomes. The example of Cotonou, Benin was given, where an air quality impact study showed that 2% of GDP was lost yearly due to air pollution, leading to budgetary provisions for AQM.
- The World Bank commented on the need for countries to prioritize issues and actions (e.g. child health, education, poverty) where resources are limited. The cost effectiveness of reducing pollution in light of poverty reduction should be clear.
- The emerging problem of 2-stroke engines (motorcycles) in East Africa was addressed, with UNEP highlighting the growing number of such motorcycles on the roads in Kenya and Tanzania. Alternatives included 4-stroke technology, which was slightly more expensive but much more fuel efficient and cleaner. There was need to ban 2-stroke engine motorcycles in these countries to prevent air quality problems faced by other African and Asian countries.
- The US EPA pointed out that in the 1970s, it was not clear if the focus for air pollution reduction was to be on industries or vehicles. However, they found that vehicles were the easiest and most effective issue to concentrate on, industrial emissions were a lot more complex and a variety of pollutants existed, so they were dealt with later. It was noted that air pollution characteristics of each country are different. However, while the majority of air pollution in sub-Saharan countries is vehicle based, a “one size fits all” approach may not be appropriate. It was therefore important to pinpoint the worst polluters and act on these. At present, there was a polluter-pays principle in effect in most of Africa, but this was open to abuse and needed better enforcement and heavier penalties to make the system functional. While the benefits of clean fuels are there, it may take some time for them to be realized.

- It was pointed out by IPIECA and other panelists that the costs to lower sulphur in fuels would depend on several factors including the base crude supply to the country, whether it had a refinery or was importing the finished product and its blending practices. In general the cost per liter could be 1.5 to 2.0 US cents for new refineries but would cost more in older African refineries. The experience in South Africa was an average cost of 2 US cents per liter to move to 500 ppm sulphur fuels (from 3,000 ppm) and a further 0.5 US cents per liter to move to 50 ppm levels. It was noted that while there were costs associated with these changes, society and the population were already bearing the cost of damaged health and environment, therefore the introduction of clean fuels would not only reduce health and environmental costs several fold, but also makes those responsible for the pollution pay for it.

54. An open discussion among ministers was then initiated by the Hon. Mark Mwandosya, Minister of Environment, Tanzania. Ministers and national representatives further elaborated on regional and national air quality concerns for which action was needed, lessons learned available, and how national priorities could be harmonized so as to address issues of common concern in AQM more effectively.
55. Ministers observed that despite existing efforts to address air pollution in Africa, many problems still existed. The major issues in AQM identified by countries included:

- *Transport*: Following the phase-out of leaded gasoline in SSA as of 1 January 2006, further improvements in fuels and vehicles were discussed, including vehicle maintenance and low-sulphur fuels. Increased vehicle traffic and imports of older vehicles, were also problems generally faced in the region. Nigeria has a ban on vehicles above 8 years of age and working catalytic converters on vehicles entering the country are mandatory. Two-stroke engines and their connection to economic hardship was mentioned; a solution was needed that addresses the poverty component of this problem as even a small price differences could be significant to buyers in African countries. There was general agreement that policy instruments encouraging cleaner fuels and vehicles were needed.
- *Industry*: Industry in Africa needed to be recognized as a major source of air pollution. Industry was also a major partner in successfully addressing air quality, taking advantage of the Kyoto Protocol Clean Development Mechanism (CDM) to improve industrial emissions. Certain mining operations (including artisanal operations) greatly affected air quality as cities grew around mining operations. Nigeria mentioned significant pollution from gas flaring during petroleum extraction. Swaziland's program for industry self-monitoring and auditing in cooperation with the environmental authority in exchange for environmental certificates was highlighted.
- *Resources for Air Quality Management*: Countries expressed a widespread need to improve availability of resources, technology, and capacity for air quality management, be it through external assistance or internal sources. 'Waste to wealth' initiatives should be developed to encourage recycling and reuse. Improved national and local air quality regimes would also allow for better

attainment of Millennium Development Goals and the successful application of Agenda 21.

- *Current and Improved Institutional Arrangements for Air Quality Management*: Independent institutions to oversee the day-to-day national environmental management with authority and resources, including management of air quality pilot projects, should be created or strengthened. There was also need to strengthen the polluter pays principle in Africa, increase the capacity for environmental inspection, and general air quality assessment and monitoring.
- *Pilot projects:* There is need to support air quality management pilot projects at the national and sub regional levels. Greater exchange of experience in the practical application of air quality policies was also important. There was general support for a sub regional approach to harmonizing air quality, fuel and vehicle standards, and air quality management approaches in general. Sub-regional approaches could build on existing sub regional unions (for example, those governing use of water and forest resources). Training for policy makers on air quality was needed - Mali provided its example of workshops for Members of Parliament on air quality that led to an increase in 50% of the budget for the Ministry of Environment. In addition, any subsequent sub-regional dialogues should include Ministries of Finance.

56. The following best practices were highlighted:
    - Madagascar listed some of its successful air quality-related instruments including an air quality action plan developed together with the World Bank, its environmental decree requiring environmental impact assessments enforced by an office responsible for harmonizing environment with industrial development, a system of environmental certificates and incentives, environmental cells in every ministry, and improved monitoring of vehicles through the Director General of Road Safety.
    - Tanzania outlined its Dar es Salaam Transportation Plan (a GEF-supported project featuring a Bus Rapid Transit (BRT) system to be implemented in the next few years). The bus system will be operational in 2008 and will cost $295 million USD over 15 years. The country has also initiated a number of fiscal incentives to help lower air pollution, including 0 % tax on solar power equipment and accessories, 20 % excise duty on vehicles imported that are 10 years or older, a ban on plastics less than 30 microns thick and a tax on those 30 microns or greater. The country also has a methane recovery project with the Italian government in Dar es Salaam through the Kyoto CDM and an air quality monitoring capacity building project supported by USEPA, /USAID and UNEP.

57. Following the day's discussions, Hon. Mark Mwandosya thanked the organisers of the conference on Better Air Quality in Sub-Saharan African Cities namely Air Pollution Information Network for Africa, Stockholm Environment Institute, World Bank's Clean Air Initiative in Sub-Saharan African Cities, United States Environment Protection Agency, United States Agency for International Development and United Nations Environment Programme for bringing together policy makers from Sub-Saharan Africa to discuss air quality in the region. He thanked the 27 countries that contributed to the discussions and for their dedication

in seeking solutions to improve air quality in the region. He then summarised the discussions of the Ministerial Session into thematic clusters as follows:

Recommendations

1. Policy and Strategic Issues

(i) Policy makers should spearhead Better Air Quality (BAQ) management in their countries and BAQ should be addressed in the context of economic development;
(ii) There is need to develop legal and regulatory frameworks to address BAQ in SSA cities;
(iii) There is need to mainstream BAQ management in poverty reduction and growth strategies (such as PRSPs);
(iv) It is important to address air quality issues jointly among countries as air pollution is trans-boundary;
(v) There is need to lower sulphur levels in fuels. However, more information regarding the costs and ramifications of lowering sulphur levels should be made available to facilitate an agreement on specific targets and timeframe at sub-regional level, similar to the preparations for the lead phase out agreement.
(vi) Transport demands will continue to increase in the region, thus the need for mass transport and better municipal and town planning, including greening of cities to address BAQ. In particular, a majority of people in SSA live in unplanned settlements, commonly referred to as slums, which also have specific issues of air pollution that need to be addressed from a policy perspective and with strategic planning;
(vii) BAQ cannot be separated from other sectors of the economy such as health, industry, transport, finance and urbanization.

2. Institutional arrangements, capacity and implementation

(i) It is important to manage the quality of vehicles being imported into the region to control vehicle emissions. It is also important to have in place mechanisms for testing, inspection and maintenance of existing vehicle fleets to achieve BAQ.
(ii) Issues of indoor air pollution are important in the region when dealing with BAQ.
(iii) There are key areas that would need to be encompassed in air quality management such as burning of solid waste and plastic waste, industrial air pollution and mining activities.
(iv) There is need for capacity to monitor and assess the present state and impacts of air pollution in the countries in Sub-Saharan Africa.

3. Public awareness, information and education

(i) It is important to raise the issue of BAQ to the public and government agencies through various schemes including education and information communication technology.
(ii) It is important to link information awareness to health impacts in the region.
(iii) It is important to share information on successful programs and projects undertaken in the region.
(iv) There is need to prepare the way forward for reduction of sulphur in fuel.

4. Cooperation and Partnerships

(i) It is important to link the outcomes of the BAQ conference to the climate change negotiations at the UNFCCC conference to be held in Nairobi in November 2006.
(ii) There is need to support and develop partnerships between government, civil society, the private sector and the international and bilateral organizations – including UNEP and the World Bank.

58. Eustache Ouayoro, World Bank Sector Manager for Water and Urban Development, Central & Western Africa, presented a statement of follow-up support for key outcomes of the conference on behalf of the conference organizers. He emphasized that the region's urbanization rates (the highest in the world) make air quality management even more important. Key decisions and actions must be taken now, as the cost of inaction would rise with deteriorating air quality. Air quality would only receive its due attention if it was made a national priority. He outlined the following key actions for follow-up, as well as the support mechanisms available for each action:

1. To develop a concrete air quality management action plan at the city level, integrated with urban development strategies taking into account all major sources of pollution and available data, including multi-stakeholder consultations. International and bilateral organizations can provide significant support in this regard (including the Clean Air Initiative for Sub-Saharan African Cities, the USEPA, and UNEP).
2. To improve and harmonize technical specifications of fuels (including environmentally sound dismantling of TEL facilities) at the sub-regional level. Support can be provided as was done under the lead phase-out efforts, including from UNEP, industry groups, sub regional groups, and through the World Bank's regional integration projects.
3. To implement cleaner vehicle strategies and regulations, including vehicle age restrictions, requirements for catalytic converters, encouragement of 4-stroke over 2-stroke engines, modernization of diesel bus fleets, and monitoring of vehicle emissions. In this regard, there are actions that can be undertaken today including legal frameworks for air quality management, regulation of imports, etc. Technical assistance is also available on vehicle maintenance and overall transport policies.

4. To undertake public awareness on the health effects of polluted air is crucial in the development and successful implementation of policy. Available air quality data should be used to facilitate decision-making.
5. To conduct public awareness campaigns on indoor air pollution health risks and to share best practice.
6. To incorporate air quality considerations in urban planning - including better transport planning, land use, and zoning.
7. To encourage non-motorized urban transport .Technical assistance and financing is available. For example, the urban transport portfolio of the World Bank in SSA includes activities in Nigeria, Benin, Burkina Faso, Madagascar, and Senegal, among others.

59. In his closing remarks Hon. Christophe Bazivamo, Minister of Environment, Rwanda, and Vice President of the African Ministerial Conference on the Environment (AMCEN) emphasized air quality and poverty alleviation linkages, focusing on the necessary investments for improvements and preventative action. A commitment to the citizens living and working in African cities should be made by countries and decision makers. He thanked the government of Kenya, the chairs, moderators and hosts and declared the Regional Conference on Better Air Quality in Sub-Saharan African Cities officially closed.