

ASIAN DEVELOPMENT BANK

TAR: AFG 37102

TECHNICAL ASSISTANCE
(Financed by the Government of Denmark)

TO THE

ISLAMIC REPUBLIC OF AFGHANISTAN

FOR THE

KABUL AIR QUALITY MANAGEMENT

October 2004

CURRENCY EQUIVALENTS

(as of 28 September 2004)

Currency Unit	–	Afghani (AF)
AF1.00	=	\$0.02
\$1.00	=	AF45.10

ABBREVIATIONS

ADB	–	Asian Development Bank
AQM	–	air quality management
ASEAN	–	Association of Southeast Asian Nations
CAI-Asia	–	Clean Air Initiative for Asian Cities
DENR	–	Department of Environment and Natural Resources (Philippines)
DOE	–	Department of Environment (Afghanistan)
MAPES	–	Mayors' Asia Pacific Environmental Summit
MIWRE	–	Ministry of Irrigation, Water Resources and Environment (Afghanistan)
NGO	–	nongovernment organization
NO ₂	–	nitrogen dioxide
PM-10	–	Particulate matter of aerodynamic diameter of less than 10 microns
SIAM	–	Society of Indian Automobile Manufacturers
SO ₂	–	sulfur dioxide
TA	–	technical assistance
TERI	–	The Energy Resources Institute (India)
UNEP	–	United Nations Environment Programme
USEPA	–	United States Environment Protection Agency
URBAIR	–	Urban Air Quality Management Strategy in Asia
WHO	–	World Health Organization

TECHNICAL ASSISTANCE CLASSIFICATION

Poverty Classification	–	Other
Sector	–	Transportation and Communication
Subsector	–	Multimodal Transport and Sector Development
Themes	–	Environmental sustainability
Subthemes	–	Urban Environmental Improvement

NOTE

In this report, "\$" refers to US dollars.

This report was prepared by Ali Azimi

I. INTRODUCTION

1. The Government of Afghanistan expressed its concern over the increasing levels of air pollution in Kabul. Against this background and at the request of the Government, from 11 to 17 February 2004 the Asian Development Bank (ADB) fielded the Fact-Finding Mission for the technical assistance (TA) for the air quality management (AQM) in Kabul.¹ The Mission reached an understanding with the Government on the goals, purpose, scope, implementation arrangements, cost, financing arrangements, and terms of reference for the TA.² ADB's 2004 country strategy and program for Afghanistan includes an advisory TA for an AQM program for Kabul, in the amount of \$450,000. The logical framework for the TA is presented in Appendix 1.

II. ISSUES

2. Qualitative and comparative assessment shows that impaired air quality in and around Kabul has had a negative impact on public health and welfare and poses a significant burden in economic and social costs³. The primary purposes of this TA are to (i) start quantifying baseline data on air quality and emissions of air pollutants in Kabul, (ii) establish a monitoring system that will support determination of changes in net air quality as a result of growth and action taken, and (iii) provide a model for export of similar approaches to other major cities in Afghanistan. The three most common criteria pollutants will be addressed by this program: particles having an aerodynamic equivalent diameter of less than 10 microns (PM-10), nitrogen dioxide (NO₂) and sulfur dioxide (SO₂).

3. Air quality in Kabul is adversely affected by vehicular emissions (diesel and gasoline); poorly maintained engines; adulterated fuels; burning of vegetation and other biomass for heating, cooking and bathing; burning of refuse; and operation of brick kilns fired by a variety of fuels, including wood and scrap tires. The poor are especially affected by air pollution as they are most directly and chronically exposed, and have few or no means of accessing medical services. The only air quality data currently available is as presented in the United Nations Environment Programme 2002 report, and is a short-term, limited sampling of air quality in Heart, Kabul, Kandahar, and Mazar-e-Sharif. Air quality continues to be degraded by increased burning of wood and waste, and the dramatic increase in the number of vehicles operating in Afghanistan. Based on informal medical reports the incidence of severe bronchitis, emphysema, allergies, asthma, and cardiac disease increasing. No other organization has undertaken further work in the measurement of air pollutants, or development of the beginnings of an AQM program in Afghanistan.

4. Kabul, the capital of Afghanistan, is also selected as the first city to be addressed as its topography and climatology result in serious and prolonged atmospheric inversions during fall and winter, difficulties with improving the air quality in Kabul, include:

- (i) lack monitoring of air quality and analysis to determine the sources of pollution (no monitoring capacity exists at present);
- (i) adulteration of fuels;
- (ii) poor maintenance of vehicle and generator engines;
- (iii) lack of an inventory of industrial and other emissions;
- (iv) no emissions testing data for location. and process-specific operations;

¹ The Mission comprised A. Azimi, senior environment specialist assisted by a consultant for air quality.

² The TA first appeared in *ADB Business Opportunities* (Internet edition) on 1 June 2004.

³ UNEP 2003. *Post Conflict Environmental Assessment*. Nairobi, Kenya.

- (v) no emission standards for various source types;
- (vi) good practices and guidelines for AQM are not known in Afghanistan; and
- (vii) given post-war conditions, pressures, and other priorities in rebuilding Afghanistan, relatively little attention is currently given to address air quality issues at the local or regional level in Afghanistan.

5. Afghanistan's local and national governments have not yet begun to coherently formulate AQM strategies. Baseline air quality and emissions data do not exist. No significant activities have been held to raise public and government awareness about the harmful impact of air pollution, and actual policy formulation or implementation of concrete AQM interventions is yet to be undertaken. A key consideration in developing policy and mitigatory measures will be the development of a strong linkage between government, private sector, and civil society in the formulation and implementation of AQM plans.

III. TECHNICAL ASSISTANCE

A. Purpose and Output

6. The objective of this TA is to assist the Ministry of Irrigation, Water Resources and Environment (MIWRE) to develop a prioritized, phased, and sustainable AQM system for Kabul. Sustainability will be achieved through (i) selection of appropriate and affordable technologies for sampling and analysis; (ii) fostering of local ownership by incorporation of MIWRE staff into the TA team; and (iii) communication of successes and data to elevate local support and sense of ownership. The AQM system developed will be useful as a template for duplication in other urban areas of Afghanistan.

7. The TA for preparing an AQM project will make a significant contribution by generating the following outputs:

- (i) baseline air quality monitoring data, and a sustainable AQM system for sampling and reporting of ambient PM-10, SO₂, and NO₂ levels in Kabul;
- (ii) baseline emissions inventory (industrial, vehicular and domestic) and a sustainable emissions inventory system;
- (iii) delivery of software tools and training to support AQM in Kabul, including development of technical proficiency in local counterparts in the public and private sectors for air pollution measurement, management, and control;
- (iv) public information documents, workshops, and seminars for informing the public and educating decision makers on the impacts of air quality in Kabul; and
- (v) development of a draft AQM system for Kabul, and Urban Air Quality strategy report, with specific policy recommendations, for the consideration of MIWRE and the Kabul Municipal Government.

8. Improvements in policies and associated legislation combined with specific activities in Kabul to monitor ambient air quality and to cost-effectively reduce emissions will help achieve medium- and long-term improvements in ambient air quality.

B. Methodology and Key Activities

9. The TA will consist of the following activities and inputs, to support the outputs.

10. **Establishing the Air Quality Monitoring System.** This component will support determination of baseline and ongoing air quality in Kabul by designing, procuring, and installing a cost-effective and sustainable system for monitoring PM-10, SO₂ and NO₂. Four to six sites, are planned, to provide upwind, downwind, crosswind, and special study sites.

11. **Establishing the Air Pollutant Emissions Baseline.** This component will support the development of an emissions inventory, including assessment of vehicular emissions, using United States Environment Protection Agency (USEPA) and or other appropriate emissions factors (e.g. The Energy Resource Institute [TERI], India; Society of Indian Automobile Manufacturers [SIAM], India; and Department of Environment and Natural Resources [DENR], Philippines). Mobile and point source emissions must be estimated concurrently so as to better understand the mix and where reductions can be achieved early on and for the least-cost. It is recognized that major source of anthropogenic emissions of PM-10 will likely be vehicles. The intent is to implement a monitoring system that will allow measurement of air quality and correlation of changes with interventions, emissions, and meteorological data.

12. **Estimating and Communicating the Importance of Economic and Social Implications of Air Pollution in Kabul.** This component will support development of an improved knowledge base and better understanding of economic and social implications of local air pollution by decision makers and the public in Afghanistan, and will include

- (i) studies of the impact of air pollution on health in Kabul;
- (ii) proper representation of air quality concerns in Afghanistan's emerging environmental strategy and building of capacity of Kabul's AQM program; and
- (iii) dissemination of AQM information in easily understood formats, through the local media and workshops, including information on how the AQM system will facilitate improved air quality in Kabul, so as to promote public acceptance of the overall approach.

13. **Assisting the Development of the Kabul Air Quality Management Strategy.** This component will help develop the framework for and draft of a comprehensive AQM strategy and plan for Kabul. The plan will be developed to satisfy the needs of Kabul and to be readily transferable to other urbanized areas of Afghanistan (e.g., Herat, Jalalabad, Kandahar, Kunduz, Mazar-e-Sharif, and Pul-I-Khumri). The strategy will present recommendations of specific policy measures for consideration of MIWRE and the Kabul Municipal Government. It will include an analysis of needs for staff, equipment, training, and regulation, for soliciting and coordinating aid from other development agencies and banks.

14. Study tours, training, professional development, conferences, public information efforts, and workshops will be planned in collaboration with the local counterparts and consultants. Local counterparts and consultants will take the lead in training and public relations activities to build on local capabilities from the start of the TA. Successes and failures in similar operating environments, such as in Pakistan and the Kathmandu Valley of Nepal, will be reviewed for use in development of AQM for Kabul.

15. **Promoting National Dialogue on Air Quality Management** This component will support development of city-level, national, and international discussion of air quality and progress in the development of AQM in Afghanistan. Activities will include

- (i) developing a national-level agenda on AQM for Afghanistan;

- (ii) coordinating and cooperating with national bodies such as ministries of interior, finance, commerce, irrigation, water resources, and environment, and Kabul Municipality;
- (iii) coordinating and cooperating with regional bodies and ongoing related projects, such as the Association of Southeast Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC), and international organizations such as United Nations Environment Programme (UNEP) that promote regional approaches to AQM, the South Asia Regional Initiative for Energy (SARI-E), of United States Agency for International Development (USAID) and ADB's Clean Air Initiative for Asian Cities (CAI-Asia);
- (iv) developing a city-based model TA to monitor and analyze the urban, regional, and transboundary air pollution, and support other measures to help implement the agenda on AQM; and
- (v) conducting at least one development assistance agency and NGO workshop, to discuss resource needs and recommended follow-up actions at the midterm of the TA, so as to initiate planning for additional funding for sustainability and growth of the AQM program in Afghanistan.

16. **Producing an Urban Air Quality Management Strategy Report.** This component will support production of an urban AQM strategy report for Kabul, patterned on the "urban AQM strategy in Asia reports completed by The World Bank under the Urban Air Quality Management Strategy in Asia (URBAIR) project in 1997. The report will also prioritize overall investment needs for AQM at the urban, regional, and national levels, taking into account the expected sources of such investments (i.e., private sector or national Government) and the mechanisms through which the polluters-pay principle can be used to eventually transfer costs to the polluters.

17. The AQM strategy will also recommend traffic management measures, fuel quality standards and testing, vehicle emissions testing, and compliance and enforcement mechanisms. The AQM system report will be an appendix to the final TA report. Inputs will include existing URBAIR reports, as models for framework, structure, data presentation, and other information developed under this TA.

C. Cost and Financing

18. The total cost of the TA is estimated at \$518,000 equivalent, comprising \$420,000 in foreign exchange and \$98,000 equivalent in local currency costs. ADB will provide \$450,000 equivalent to finance the entire foreign cost and \$30,000 equivalent of the local currency costs. The TA will be financed on a grant basis by the Government of Denmark, and administered by ADB. The Government will finance the remaining \$68,000 equivalent of the local currency costs. The detailed cost estimates and financing plan are provided in Appendix 2.

D. Implementation Arrangements

19. The Executing Agency will be MIWRE's Department of Environment (DOE) which will provide the counterparts to TA staff. The TA manager will have a background in physical sciences and will be appointed to work closely with consultants in the management and implementation of the TA.

20. The TA will require 48 person-months of consulting services: 6 person-months of an international consultant and 42 person-months of domestic consultants. The consulting team will

comprise individuals with expertise in AQM, and environmental economics and policy. Domestic consultants will have experience with or knowledge of AQM, sampling and analyses, reporting, technical training, public communications, and organization and execution of workshops.

21. DOE will provide office accommodation and logistical support for TA implementation. DOE will also be responsible for coordinating with Kabul municipality, the Ministry of Interior (MOI), and non-government organizations (NGO), particularly in securing air quality monitoring equipment at the sites in Kabul.

22. The TA will be implemented over a 12-month period, to commence in October 2004 and will be completed by September 2005. The TA will also facilitate the work with NGOs and stakeholders to broaden support and cultivate additional sources of funding for expansion and continuation of the AQM system program. This will be accomplished through routine communication of progress and findings, and timely dissemination of information.

23. The consultants will be engaged by ADB in accordance with its *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the engagement of domestic consultants. Equipment will be procured based on ADB's *Guidelines for Procurement*, using international shopping procedures. Due to the complexity of the assignment and high local labor content, the consultants are to be engaged individually. Outline terms of reference are presented in Appendix 3.

24. The consultants will submit an inception report focusing on the work program, not later than 4 weeks after the services begin. An interim and a draft final report will be submitted after 4 months and 11 months after inception, respectively. Tripartite meetings will be held in Kabul to discuss the inception and interim draft final reports.

25. The reports developed under this TA will be provided to MIWRE and ADB, and will be made available for distribution on the ADB and CAI-Asia web site, as well as other communication channels of CAI-Asia. Local workshops are planned for Kabul, with invitees from other cities where establishment of a local system for AQM is desired. Furthermore, the TA will support the (i) organization of one workshop to disseminate the results of the TA, and (ii) the participation of key project stakeholders in other relevant regional workshops.

IV. THE PRESIDENT'S DECISION

26. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$450,000 to the Government of Afghanistan to be financed on a grant basis by the Government of Denmark for the Kabul Air Quality Management Project, and hereby reports this action to the Board.

TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators / Targets	Monitoring Mechanism	Assumptions and Risks
<p>Goal</p> <ul style="list-style-type: none"> • Improve air quality in Kabul. • Formulate ambient air quality standards. • Formulate policy for reducing vehicular emissions. 	<ul style="list-style-type: none"> • Ambient air quality meets WHO standards. • Announcement of the approved government policy. 	<ul style="list-style-type: none"> • Government air Quality reports. 	
<p>Purpose</p> <ul style="list-style-type: none"> • Assist the Government to develop air quality management (AQM) strategies and implementation framework. • Strengthen human resources and institutional capacity of AQM. 	<ul style="list-style-type: none"> • An AQM strategy is adopted by the Government after Technical Assistance (TA) completion. • Government officials are trained during TA completion. • Public awareness is raised. 	<ul style="list-style-type: none"> • Existence of a strategy and regulatory framework. • Publications on air quality. • TA progress reports. 	<p>Assumptions</p> <ul style="list-style-type: none"> • The Government is strongly committed to TA implementation. • Enforcement skill and technology of AQM. • Trained government staff in their posts. <p>Risks</p> <ul style="list-style-type: none"> • The legal and regulatory framework is not in place. • Trained staff leave their posts.
<p>Activities</p> <ul style="list-style-type: none"> • Establish Air Quality monitoring system for Kabul. 	<ul style="list-style-type: none"> • Installation and startup. 	<ul style="list-style-type: none"> • Emissions data acquired. 	<ul style="list-style-type: none"> • Delayed delivery, logistical or tariff issues.

Continued on next page

Design Summary	Performance Indicators / Targets	Monitoring Mechanism	Assumptions and Risks
<ul style="list-style-type: none"> • Develop AQM strategy for Kabul. 	<ul style="list-style-type: none"> • Approval of strategy by the Ministry of Irrigation, Water Resources and Environment. 	<ul style="list-style-type: none"> • Draft report. 	<ul style="list-style-type: none"> • Lack of political support.
<p>Outputs</p> <ul style="list-style-type: none"> • An air quality management strategy. • Provision of hardware and software facilities for better enforcement of and compliance with air quality legislation. • Strengthened government human resources and enforcement capacity. 	<p>A strategy prepared in the third quarter of TA implementation.</p>	<ul style="list-style-type: none"> • TA implementation inception, progress, interim, and final reports. • Tripartite meetings following submission of inception, interim, and draft final reports. 	<p>Assumption The government provides counterpart staff and budget support.</p> <p>Risks</p> <ul style="list-style-type: none"> • Government counterpart staff and funding are insufficient due to budget deficits. • Governance and enforcement are poor. • The Government lacks commitment.
<p>Inputs</p> <ul style="list-style-type: none"> • Consultants. • Government counterpart support and staff. • Equipment. • Training Workshops. 	<ul style="list-style-type: none"> • Consultants recruited in October 2004. • Equipment purchased and fully utilized for the TA. • Workshops delivered and achieved training objectives. 	<ul style="list-style-type: none"> • Final report of the TA. 	<p>Assumptions</p> <ul style="list-style-type: none"> • Consultants are Competent. • Counterpart staff and budget are available on time. <p>Risks</p> <ul style="list-style-type: none"> • Government delays signing the TA letter. • Government delays providing counterpart budget.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Government of Denmark Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants ^b	138.0	0.0	138.0
ii. Domestic Consultants ^c	42.0	0.0	42.0
b. International and Local Travel ^d	20.0	0.0	20.0
c. Reports and Communications	5.0	5.0	10.0
2. Equipment ^e	115.0	0.0	115.0
3. Training, Seminars, and Conferences			
a. Training and Workshops	15.0	10.0	25.0
b. Study Tours ^f	15.0	0.0	15.0
4. Contingencies	40.0	15.0	55.0
5. Media and Public Information	30.0	0.0	30.0
Subtotal (A)	420.0	30.0	450.0
B. Government Financing			
1. Office Accommodation and Transport	0.0	58.0	58.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	10.0	10.0
Subtotal (B)	0.0	68.0	68.0
Total	420.0	98.0	518.0

^a Administered by the Asian Development Bank.

^b For 6 person-months.

^c For 42 person-months.

^d Estimated assuming an average of one international every 2 months per international consultant.

^e Consisting of air pollution monitoring equipment, sampler media, and 1 year of laboratory chemicals. Equipment will be transferred to the Ministry of Irrigation, Water Resources and Environment on completion of project.

^f For five study tours, budgeted at \$3,000 each.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. International Consultant: Air Quality Management Specialist (6 person-months)

1. The consultant will
 - (i) help the Asian Development Bank (ADB) specialist to implement the technical assistance (TA);
 - (ii) oversee the selection of air quality monitoring sites and collection of emissions inventory data for Kabul;
 - (iii) oversee installation and operation of the air quality monitoring sites;
 - (iv) oversee facilitation by domestic consultants to install and operate the air quality monitoring network;
 - (v) be responsible for the formulation of project concept papers;
 - (vi) conduct dialogues with other multilateral and bilateral development organizations as well as international nongovernment organizations on their possible contribution to the development and implementation of the Kabul Air Quality Management (AQM) plan and network;
 - (vii) develop specific policy recommendations for incorporation in to the Kabul AQM plan; and
 - (viii) design and manage study tours, workshops, seminars, professional development, and public information activities.

B. Domestic Consultants (42 person-months)

1. Assistant Implementation Coordinators (36 person-months)

2. The consultants will
 - (i) assist the TA specialist and international consultant to coordinate implementation of the TA;
 - (ii) help recruit and coordinate domestic consultants;
 - (iii) provide inputs in the formulation of the project concept;
 - (iv) provide back-up support in the absence of the AQM specialist;
 - (v) manage the domestic consultant team;
 - (vi) assume all duties of the AQM specialist at the end of month six of the TA;
 - (vii) calculate emissions based on accepted emission factors;
 - (viii) research and report on issues such as fuel use rates, fuel analyses, local epidemiology, and local perceptions of environmental quality and social impacts;
 - (xi) help tabulate of numerical and qualitative results, and write reports; and
 - (x) provide translator services to the international consultant, and translate all reports and media materials in to the Dari language.

2. Air Quality Management Sampling Network Operators (6 person-months)

3. The consultants will
 - (i) install, service, and operate air quality sampling equipment;
 - (ii) prepare sample media for exposure, and shipment of sample media for analyses; and
 - (iii) assist researchers as time allows.