No.

Japan International Cooperation Agency

Tehran Provincial Directorate
Department of the Environment

The Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran

FINAL REPORT
Summary

January 2005

PADECO Co., Ltd.

PACIFIC CONSULTANTS INTERNATIONAL

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PREFACE

In response to a request from the Government of Islamic Republic of Iran, the Government of Japan decided to conduct “The Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran” and entrusted the Study to the Japan International Cooperation Agency.

JICA dispatched to Iran a study team headed by Mr. Yuichiro Motomura, PADECO Co., Ltd. and composed of members of PADECO Co., Ltd. and Pacific Consultants International, four times during the period between September 2002 and December 2004.

The team held discussions with the officials concerned of the Government of Iran, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the air quality management in Iran and to the enhancement of friendly relations between our two countries.

Finally I wish to express my sincere appreciation to the officials concerned of the Government of the Islamic Republic of Iran for their close cooperation extended to the study.

January 2005

Etsuo Kitahara
Vice-President
Japan International Cooperation Agency

January 2005

Mr. Etsuo Kitahara
Vice-President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the final report of "The Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran".

This report presents the results of the study, which was undertaken in the Islamic Republic of Iran from September 2002 to December 2004 by the Study Team, organized jointly by PADECO Co., Ltd. and Pacific Consultants International.

The Study Team, in association with counterpart personnel in Iran appointed by the Government of Iran, and in cooperation with a diverse sectors of the people in Iran, has formulated a comprehensive set of management improvement action measures for the administration of improving air quality in Tehran and has implemented selected priority programs. Because of the nature of planning and implementation processes involving intensive participation of various stakeholders, we believe that a fair amount of tangible and intangible achievements has been realized in the form of improved work of related organizations and counterpart personnel.

We owe a great deal to many people for the completion of this report. We would like to express our deep appreciation and sincere gratitude to all those who extended their kind assistance and cooperation to the Study Team, in particular, the concerned officials of the Department of Environment, the Executive Committee for Reducing Air Pollution in Tehran.

We are very much thankful to the officials of your agency, the JICA Advisory Committee, the Ministry of Foreign Affaires, and the Ministry of the Environment.

We hope that the report will contribute to facilitating further socio-economic development in the Islamic Republic of Iran.

Very truly yours,

Yuichiro Motomura
Team Leader
The Study on Strengthening and Improving Air Quality Management
in the Greater Tehran Area in the Islamic Republic of Iran

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ABBREVIATIONS

AC	Advisory Committee
AIRIC	Automotive Industries Research & Innovation Center
AQCC	Air Quality Control Company
AQMD	Air Quality Management District
ARB	Air Resources Board
BS	Bachelor of Science
Cal/EFA	California Environmental Agency
CARB	California Air Resources Board
CBOs	Community Based Organizations
CBD	Central Business District
CFCS	Center for Computer Service
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COPERT	Calculation of Air Pollutant Emissions from Road Transport
DOE	Department of the Environment
DOE-TPD	Department of the Environment, Tehran Provincial Directorate
DOE HQs	Headquarters of DOE
EC	Executive Committee for Reduction of Air Pollution
ECE	Economic Commission for Europe, United Nations
EED	Environmental Education Directorate, DOE
EHC	Environmental High Council
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPEA	Environmental Protection and Enhancement Act
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GIS	Geographic Information System
GPA	Green Productivity Activities
GTA	Greater Tehran Area
HC	Hydrocarbon
HOV	High Occupancy Vehicle
HRD	Human Resources Development
IASCO	Spare Parts & After Sales Service
ICSRC	Iran Civil Society Organization Resource Center
IFCO	Iran Fuel Conservation Organization
IPCO	Iran Khodro Power Train Company
IRIB	Islamic Republic of Iran Broadcasting
IRIMO	Islamic Republic of Iran Meteorological Organization
IRR	Iranian Rials
ISO	International Standard Organization
IT	Information Technology
IU	Implementing Unit
JARI	Japan Automobile Research Institute
JICA	Japan International Cooperation Agency
LGAC	Local Government Advisory Committees
LPG	Liquefied Petroleum Gas

LRT	Light Rail Transit
MAP	Management Action Plan for Air Quality Improvement
MESIP	Mobile Emission Sources Inventory Preparation
MIM-EB	Ministry of Industry and Mines' Environmental Bureau
MIS	Management Information System
MM	Man Month
MODEM	Modulator-Demodulator
MOE	Ministry of Energy
MOH	Ministry of Health
MOI	Ministry of Interior
MOIM	Ministry of Industry and Mines
MOM	Meteorological Agency
MOO	Ministry of Oil
MOPTT	Ministry of Post, Telephone and Telegraph
MOT	Municipality of Tehran
MOTT	Ministry of Traffic and Transport
MPO	Management and Planning Organization
MS Project	Microsoft Project
NGOs	Non-governmental Organizations
NIGC	National Iranian Gas Company
NIOC	National Iranian Oil Company
NMHC	Non-methane Hydrocarbon
NOx	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NPC	National Petrochemical Company
O_3	Ozone
OAR	Office of Air and Radiation
OJT	On-the-Job Training
PM	Particulate Matter
PM_{10}	Particulate Matter up to 10 Micrometers in Size
PP1	Pilot Project 1
PP2	Pilot Project 2
PP3	Pilot Project 3
PP4	Pilot Project 4
PP5	Pilot Project 5
PP6	Pilot Project 6
PP7	Pilot Project 7
PPD	Public Relation Directorate, DOE
PPMU	Pilot Project Management Units
PPMU1	Pilot Project Management Unit 1
PPMU2	Pilot Project Management Unit 2
PPMU3	Pilot Project Management Unit 3
PPMU4	Pilot Project Management Unit 4
PPMU5	Pilot Project Management Unit 5
PPMU6	Pilot Project Management Unit 6
PPMU7	Pilot Project Management Unit 7
PR	Public Relation
PSI	Pollution Standard Index
SCATS	Sydney Coordinated Adaptive Traffic System
SCI	Statistical Center of Iran
SESIP	Stationary Emission Sources Inventory Preparation

SIP	State Implementation Plan
SOx	Sulfur Oxide
SO_2	Sulfur Dioxide
SPM	Suspended Particulate Matter
SRU	Council of Environmental Advisors
TAP	Ten-Year Action Plan
TCTTS	Tehran Comprehensive Transportation and Traffic Studies
TEO	Tehran Environmental Office, DOE-TPD
TERP	Tehran Transport Emissions Reduction Project
THC	Total Hydrocarbon
TMG	Tokyo Metropolitan Government
TOR	Terms of Reference
TTTC	Tehran Traffic and Transportation Company
TTTO	Tehran Traffic and Transport Organization
TUSRC	Tehran Urban and Suburban Railway
TVTIB	Tehran Vehicle Technical Inspection Bureau
UBC	United Bus Company
UMK	Conference of Environmental Ministers
US	United States of America
USD (US$)	US Dollar
VTIC	Vehicle Technical Inspection Centers
WBGU	Advisory Council on Global Change
WGs	Working Groups
WG1	Working Group1
WG2	Working Group2
WG3	Working Group3
WG4	Working Group4
WG5	Working Group5
WHO	World Health Organization
WSAEP	Women Society Against Environmental Pollution

Executive Summary

Introduction

1. This report is an executive summary of the main report for the Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area and consists of the following sections:

- Introduction;
- Review of Regulatory and Institutional Frameworks;
- Review of Air Quality Management;
- Pilot Projects and Identification of Management Issues;
- Management Action Plan (MAP) for Air Quality Improvement;
- Capacity Building for the Executive Committee Secretariat;
- Preparation of Stationary and Mobile Source Inventories;
- Progress on Other MAP Measures; and
- Recommendations.

2. Tehran, the economic center of Tehran Province, as well as the nation, faces a serious environmental problem in its air quality. In 2002, the Greater Tehran Area (GTA) had an estimated population of 8.52 million and has exhibited rapid urbanization over the past decade. Its main air quality problems have grown from rapid growth of vehicles, a large number of aging polluted vehicles, and the low price of gasoline that encourages the dependence on automobiles.

3. To cope with the severe air pollution problem, the Executive Committee for the Reduction of Air Pollution (EC), consisting of representatives of related organizations, formulated the Action Plan for Transportation Air Pollution Reduction in Tehran (Ten-Year Action Plan).[1] Although the Cabinet approved the Ten-Year Action Plan in 2000, its implementation has not progressed at a suitable pace. Since technology, plans, and organization to reduce air pollution exist, the problem lies with the implementation of technologies and plans, not the technology itself. This means that the main problems pertain to organizational and institutional issues.

4. Thus, the Government of the Islamic Republic of Iran (the Government) requested the Government of Japan to provide technical assistance to solve these issues and consequently, accelerate the implementation of the Ten-Year Action Plan. In response, the Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran was administered by the Japan International Cooperation Agency (JICA) and implemented by a team of experts organized by PADECO Co., Ltd. and Pacific Consultants International.

5. The objectives of the Study as specified by the Scope of Work are as follows:

- To develop and collaborate in the implementation of a MAP to Strengthen and Improve Air Quality Management pursuant to the Integrated Air Pollution Control Plan in the GTA; and

[1] The Ten-Year Action Plan consists of 36 major programs, classified into 7 fields, including (i) new motor vehicles, (ii) used vehicles, (iii) public transportation, (iv) fuel, (v) technical inspection and maintenance program, (vi) traffic management, and (vii) public education and participation.

- To build capacity for Iranian counterpart personnel to accelerate the implementation of the developed MAP through technology transfer in the Study.

6. The MAP was defined as a set of soft measures to solve institutional and organizational issues, resulting in accelerating the Ten-Year Action Plan. This included measures such as those to clarify roles of concerned agencies, strengthen coordination, and enhance organizational capacities.

7. The Government designated Tehran Provincial Directorate of the Department of the Environment (DOE-TPD) as the counterpart agency for the Study and appointed several Iranian counterpart personnel to work with the JICA Study Team. Together, a Project Team was formed and Mr. M.H. Hakimian was appointed as the National Project Director. Figure ES. 1 shows the general structure of the study organization that was maintained through the study period. Within this structure, Iranian counterparts were assigned to Japanese experts, based on fields of expertise and specialty, to enable capacity building.

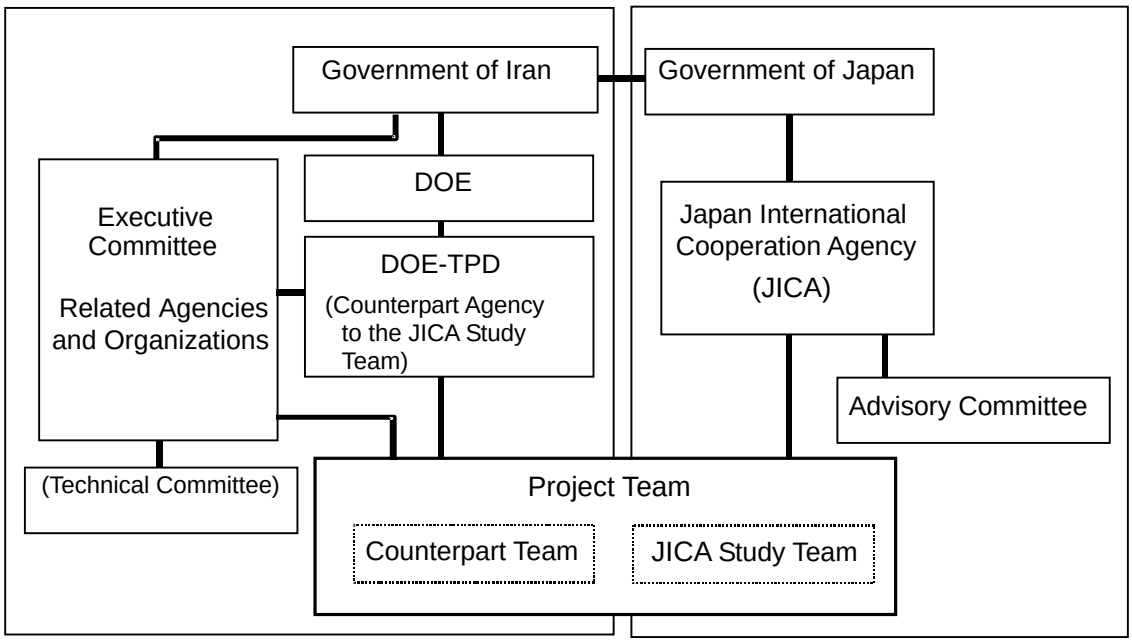

Figure ES. 1 Structure of the Study Organization

8. The current situation, including progress of the Ten-Year Action Plan was evaluated. Preliminary analysis of management issues was completed and seven pilot projects were identified. Through the implementation of these pilot projects, weaknesses in the management system were identified and guidelines for formulating the MAP were created. From the guidelines and the pilot projects, MAP measures were then created.

9. The Study was conducted between September 2002 and January 2005. It was divided into three phases with each April being the starting period for the next phase. The first phase was a review of the situation, the second phase involved the implementation of pilot projects and formulation of the MAP, and the third phase involved implementation and monitoring of MAP.

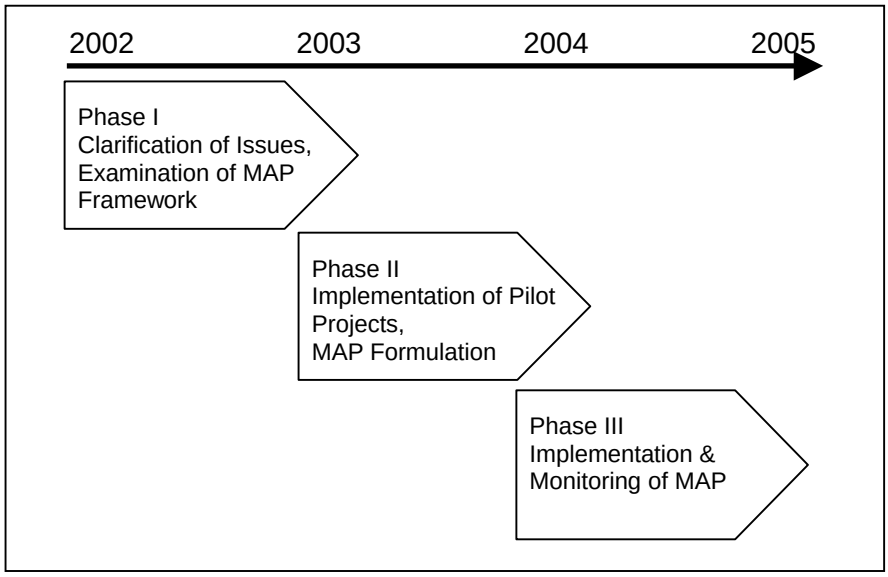

Figure ES. 2 Study Flow

Review of Regulatory and Institutional Frameworks

Regulatory Frameworks

10. The most fundamental provision for preservation of the environment was Article 50 of the Constitution (1979). The Environmental Protection and Enhancement Act (EPEA, 1974) focuses on institutional matters, including responsible authorities, such as DOE and the Environmental High Council. The Air Pollution Abatement Act (1995) outlines relevant organizational responsibilities as well as the control procedures of air pollutant sources: motor vehicles, factories, workshops, power plants, and commercial and residential sources.

11. DOE was established by EPEA in 1974 and is responsible for preventing and controlling any form of environmental pollution. Although the Air Pollution Abatement Act and the related by-laws do not refer explicitly to the institution(s) responsible for air quality monitoring, it is construed that DOE is responsible because of Article 1 of the EPEA. From a regulatory framework perspective, it appears that there is no clear rationale for pollution control in either the Constitution or other relevant laws. This is different from many other countries, in that other countries' environmental laws specifically acknowledge that pollution control is undertaken to protect people's health or to promote public welfare. Additionally, when DOE tries to coordinate related organizations, it faces difficulties, because there is no legal basis for DOE to have the responsibility to coordinate with other organizations. To further complicate matters, the roles of the national government, local governments, industries, citizens, non-governmental organizations (NGOs), and others are not clearly defined within the laws and regulations.

12. DOE has approximately 3,500 employees and consists of directorates under four deputy heads, four independent offices, twenty-eight provincial directorates, the College of the Environment, and the Institute for Scientific and Applied Environmental Research. DOE creates comprehensive plans for air pollution reduction and sets regulations and standards including ambient air quality standards and emission standards for stationary and mobile sources. In addition, it is responsible for preparing human resources development plans for DOE officials.

DOE provincial directorates are mainly responsible for enforcing laws and measures and monitoring the environmental quality, including air quality, in their province. The relevant provincial directorate in Tehran, the Tehran Provincial Directorate (DOE-TPD), covers the aerial jurisdiction of Tehran Province. DOE-TPD has about 230 employees and consists of five deputy offices, four independent divisions, a computer center, and twelve environmental offices. Its role is mainly to enforce laws and measures and monitor the environmental quality.

Comparative Institutional Analysis of the State of California and Tokyo Metropolitan Government

13. As part of institutional framework reviews, institutional arrangements for Tehran's air quality control were compared with the State of California (United States) and Tokyo Metropolitan Government (Japan) (Table ES. 1). Although seemingly similar, California and Tokyo exhibit a broad range of cultures, society, and government institutions, as the US is notably individualistic and decentralized, whereas Japan is group focused and centralized. They share similar issues with Tehran in the magnitude of mobile source emissions.

Table ES. 1 Comparison of Air Quality Management in California, Tokyo, and Tehran

Function	California	Tokyo	Implications to Tehran
Government Roles and Responsibilities	- State can set more stringent standards than national government - State government responsible for mobile source emissions - Regional air basins created by topography with air quality management districts for management. They establish and enforce air pollution regulations of stationary sources	- Greater authority to local governments for environmental management - Central government sets air quality and emissions standards for stationary and mobile sources - Prefectural government enabled to set more stringent standards.	- Authority must be at problem level - Enable DOE-TPD to make decisions - Clarify stationary/mobile source responsibilities
Organizational Design	- Organized based on media - Air Resource Board - Clear and detailed structure with well defined roles and responsibilities - Individual department focused on mobile sources	- Organized by topics – Automotive Pollution Control Division - Clear and detailed structure with well defined roles and responsibilities - Individual department focused on mobile sources	- Disaggregate responsibilities between DOE and DOE-TPD - Clarify responsibilities in organization and sub-organizations - Clearly organize institutions around major pollution causes, including monitoring and enforcement

Function	California	Tokyo	Implications to Tehran
Decision-Making Process	- California Air Resources Board (CARB) and regional management districts use permanent boards as decision makers supported by permanent employees for research - Board members are drawn from outside of the administration - Use boards and advisory groups to discuss issues and make recommendations - Use experts and the public as members of boards and advisory groups	- Tokyo Metropolitan Government (TMG) uses temporary councils for specific issues, supported by a Secretariat of bureaucrats - Decision-making is done largely by its administration aided by councils pending approval by the city assembly - Use councils and committees to discuss issues and make recommendations - Use experts and the public as members of councils and committees	- Improve and expand support system - Clear authority - Clear and strong coordination responsibilities - Utilize experts during discussions - Reference earlier meetings to enhance discussions
Air Quality Monitoring and Data Collection	- Monitoring stations operated by public sector and private contractors - Integrate and publish all monitored and industry-submitted data online - Utilize data for decision-making	- Monitoring stations operated by the public sector - Integrate and publish all monitored and industry-submitted data online. - Utilize data for decision-making	- Integrate data from DOE-TPD and Air Quality Control Company - Publish results online for public consumption - Utilize data for decision-making
Public Participation	- Public board members in CARB are appointed permanently - Open/public meetings and forums to discuss regulations and standards - Public hearings to appeal new regulations and standards - Publication of government documents	- TMG council public members are temporary - Open/public meetings and forums to discuss regulations and standards - Public hearings to appeal new regulations and standards - Publication of government documents	- Invitation to participate on committees - Open committee meetings to the general public - Initiate an appeals process - Publication of documents to obtain feedback and transparency

Source: The JICA Study Team

Institutional Frameworks

14. Air pollution control management is initiated by DOE and its provincial directorates and implemented in cooperation with various organizations. They include Ministry of Health (MOH), Ministry of Interior (MOI), Ministry of Industry and Mines (MOIM), Ministry of Oil (MOO), Ministry of Post, Telephone and Telegraph (MOPTT), Ministry of Agriculture Jihad, Islamic Republic Iran Broadcasting (IRIB), the Municipality of Tehran (MOT), and Traffic Police. To coordinate dispersed duties among these related organizations, the Executive Committee for the Reduction of Air Pollution (EC) was established in 1997 in Tehran as a unique inter-agency coordination body. The overall role of the EC is to reduce the air pollution in Tehran to the level of the World Health Organization (WHO) based on the Second Economic,

Social, and Cultural Development Plan Law (Note 82 B) and its Executive By-law (Article 10) of 1995. The EC is chaired by the Deputy Head of DOE and with the Director General of DOE-TPD as the Secretary. More than a dozen other agencies are represented and the EC meets every other Monday and have had more than 130 meetings so far. A Secretariat supports the EC by setting the agenda, notifying members of meetings, and recording discussions.

Regulatory and Institutional Issues

15. Discussions with the EC and an assessment of laws and regulations, as well as the institutional capacities of DOE-TPD, led to the identification of various management issues. Legal and regulatory issues include (i) clarification of the purpose of pollution control; (ii) limited procedures to react to environmental changes; (iii) insufficient articulation of coordination; and (iv) limited local power. DOE-TPD institutional capacity issues include (i) insufficient coordination; (ii) insufficient data quality; (iii) limited public participation; and (iv) insufficient human resources development. The EC, while a positive feature in its own right and critical to improving air quality in Tehran, has issues surrounding its unsystematic focus of meeting discussions and limited technical support from its Secretariat.

Review of Air Quality Management

16. Tehran faces a serious environmental problem in its air quality. According to the government's Annual Report 1383 (Iran) on major air pollution parameters, CO (carbon monoxide) and PM (particulate matter) exceed the ambient air quality standard in most of monitoring stations in the GTA in 1382 (Iran). CO pollutant has increased over the last three years and PM pollution has remained the same during this period. In contrast, NO_2 (nitrogen dioxide) and SO_2 (sulfur dioxide) values are below the standard at almost all monitoring stations in 1382 (Iran). CO emissions are about 80% of total emissions and most CO emissions are derived from mobile sources. For other pollutants, about 70% of NO_x (nitrous oxides), about 50% of PM (particulate matter) with a diameter of less than 10 μm (PM_{10}) emissions, and about 90% of HC (hydrocarbons) are also derived from mobile sources. In contrast, about 80% of SO_x (sulphur oxides) emissions are caused by stationary sources.

17. Air quality is monitored by both DOE-TPD and the Municipality of Tehran's Air Quality Control Company (AQCC) and they operate seven and four fully automated multi-factor stations, respectively. The monitoring data quality and evaluation methodology have significantly improved over the past two years, resulting in a greater validity of monitoring data, because of capacity building for DOE-TPD laboratory staff by a JICA expert, including the establishment of an air quality management system that includes four computer programs that has been introduced to the DOE-TPD laboratory.

18. The national ambient air quality standards have been revised several times in recent years. O_x (oxides) was recently added to the standards and evaluation methodologies for CO, SO_2, and SPM (suspended particulate matter), which include PM_{10}, are evaluated. Tehran utilizes the Pollution Standards Index (PSI) to report the daily air quality situation to the public via five categories from clean to dangerous. Once the PSI is calculated, the Air Pollution Emergency Coordination and Control Committee informs the public in the event of poor air quality based on guidelines for decision-making and actions for emergency cases.

Stationary Source Management

19. DOE-TPD has the authority to manage stationary sources within Tehran Province. Sections of the Deputy of Human Environment of DOE-TPD, which include the laboratory, are in charge of daily operations of stationary source management. A stationary source emissions inventory was initially developed in 1997 in order to identify the need for pollution control measures and assist pollution control regulators in targeting the most significant problems, but no further movement has occurred since the JICA-funded project ended. Iran does require that any individual directly emitting a pollutant into atmosphere must obtain a permit from DOE by filing an application prior to beginning construction.

20. DOE uses administrative acts to enforce their legislation in addition to criminal sanctions. Criminal law is not usually invoked, but fines, administrative orders, and economic sanctions can be imposed directly by the DOE. Site inspections take place on a regular and unannounced basis, although data acquisition is in its initial stages. Residents can also file complaints and site inspections can follow, although this is not enacted frequently.

Mobile Source Management

21. At the time of the report, DOE had not institutionalized even the first stage of mobile source management and monitoring. The mobile source inventory has not been updated since 1997 when it was developed under the JICA-funded project. Currently, the emission levels by type of pollutants and sources are based on 1994 data, which is inaccurate and should be updated given the almost tripling in number of passenger vehicles.

22. The Ten-Year Action Plan was implemented to reduce air pollution in Tehran and focused mainly on pollutants generated from mobile sources. It was reviewed and some findings are shown as follows:

- The ECE R83 Standard for all locally produced passenger cars was implemented in 2003 - two years ahead of the original schedule;
- Implementing emission reduction measures for motorbikes will be difficult because it requires an exhaust emission test laboratory, which does not exist in Iran;
- The replacement of carburetors with fuel injection systems in Paykans under ten years old has not made progress;
- Maintenance of defective cars will be conducted in workshops at inspection centers and vehicle repair shops. The majority of these workshops and repair shops have no specific or regular training;
- At the time, there are only 127 intersections equipped with intelligent signals. Target is to equip 209 intersections, but there are budget problems; and
- The supply of parking facilities is significantly less than demand.

Public Awareness Campaigns

23. Public awareness campaigns are a central part of air quality management activities. The public awareness campaigns on air pollution control are currently being promoted by various agencies including governmental agencies and NGOs and include information dissemination or education/training. Most of the government agencies use the media to disseminate information. Governmental agencies tend to organize technical and internal trainings in the form of seminars and workshops. Meanwhile, NGOs emphasize education through a participatory approach at the grassroots level. Public awareness campaign activities are underway, but there are still

significant gaps in people's understanding of causes, risks, and solutions due to (i) lack of focused approach from the government and NGOs; (ii) limited cooperation in conducting campaigns among related organizations; (iii) limited expertise; and (iv) lack of assessments of the campaigns to gather lessons learned.

Air Quality Management Issues

24. The following issues were identified with respect to the air quality monitoring system, stationary and mobile source management, and public awareness campaigns. Monitoring system issues include (i) insufficient maintenance of measuring equipment, caused by a lack of insight in the need for spare parts; (ii) limited capacity for laboratory staff, although it has improved in the past few years; (iii) unsuitable locations of monitoring equipment in the GTA; and (iv) in the case of poor air quality, the current emergency warning system is too slow to react due to a complicated process and the involvement of too many agencies.

25. Stationary and mobile sources management issues include (i) the need to upgrade the mobile and stationary source inventories; (ii) greater vehicle improvements as outlined by the Ten-Year Action Plan; (iii) improve human resource development and capacity to undertake vehicle inspections; (iv) fully implement traffic management upgrades such as parking management, intersection improvement, and pedestrian signal installation; and (v) undertake public transportation improvements and promotion.

Pilot Projects and Identification of Management Issues

26. At the end of the first year of the project, the JICA Study Team and national counterparts proposed the implementation of pilot projects to obtain a better understanding of the real problems of air quality management and to seek more effective methods to rectify them. The pilot projects and their objectives are shows Table ES. 2:

Table ES. 2 Pilot Projects and their Objectives

Project Title	Objectives of Pilot Projects
PP1: Inventory Preparation for Stationary and Mobile Emission Sources	- To identify underlying problems that constrain DOE-TPD in developing an air emissions inventory in terms of data availabilities, capabilities of DOE-TPD staff and private companies, and organizational and legislative readiness; and - To prepare action plans for relevant organizations to establish an inventory database for stationary and mobile emission sources by identifying measures to address underlying problems.
PP2: Introduction of a Management Information System (MIS) for the Executive Committee	- To identify detailed characteristics or methods for EC discussions/decisions; - To assess effectiveness of MIS and capacities of current EC Secretariat and identify conditions of a full-scale operation by introducing MIS on a limited scale; and - To prepare action plans for relevant organizations to strengthen the EC Secretariat.

Project Title	Objectives of Pilot Projects
PP3: Preparation of a White Paper	- To clarify various issues in terms of coordination or communication mechanisms, information gathering systems, and data quality by preparing a White Paper; - To assess the effectiveness and capacities of preparing the White Paper and identify the conditions for an annual update; - To outline methods for better coordination among various agencies and those concerned; and - To prepare action plans for relevant organizations to remedy the identified issues and institutionalize the preparation of the White Paper.
PP4: Improvement of Exhaust Emissions by Replacing Carburetors of Used Vehicle	- To identify major institutional and organizational issues found by implementing the replacement of used Paykans' carburetors with proven technology; - To identify the level of awareness and willingness of individual drivers and factors which influence them; and - To prepare action plans for relevant organizations to improve organizational framework for the implementation and drivers awareness.
PP5: Public Awareness Campaign Focused on Vehicle Inspections and Air Pollution Abatement Policies	- To identify organizational and methodological issues by introducing a public campaign focused on vehicle inspection; - To establish a prototype of public awareness campaign methods, procedures, and organizational arrangements; and - To prepare action plans for relevant organizations to improve public awareness campaign.
PP6: Human Resources Development for Inspection Centers and Repair Shops	- To assess human resources development (HRD) capabilities of Tehran Vehicle Technical Inspection Bureau (TVTIB) and repair shops in terms of organizational readiness, capabilities of responsible staff, and knowledge about HRD by implementing a training program; - To establish a prototype for training course planning, implementation, and evaluation; and - To prepare action plans for relevant organizations to improve HRD.
PP7: Traffic Management Measures	- To assess the strengths and weaknesses of traffic related authorities in Tehran in implementing parking management, intersection improvements, and pedestrian signal installation; - To assess the effectiveness of these measures in reducing emissions and traffic congestion; and - To prepare action plans for relevant organizations to improve traffic congestion and use of public transport systems.

27. The implementation of the pilot projects was sub-contracted to various Iranian consulting firms under the supervision of Pilot Project Management Units (PPMUs), which consist of representatives from related organizations, counterparts, and JICA Study Team members. The implementation processes generated problems and lessons learned that were analyzed from a managerial perspective. As a result, managerial issues or directions for improvement were identified, which were used to create the MAP.

28. The lessons learned for each of the Pilot Projects are outlined below:

- PP1: difficulties in collecting information and unclear focal points for the mobile source inventory; limited human resource capacity to develop the inventory database; and unclear role of DOE-TPD Laboratory for mobile sources emission management.

- PP2: need to change the nature of EC discussions through the use of data and past records of discussions; limited supporting functionality by the EC Secretariat; lack of

skills and limited manpower of EC Secretariat; and negative attitudes of EC members towards information disclosure and data accuracy.

- PP3: definition of a DOE-TPD division with long-term responsibility for updates; large effort required collecting various information/data; and this pilot project proved to be a very useful coordination tool.

- PP4: ambiguous roles and responsibilities among related organizations and no one specific organization was totally responsible; unclear certification of new technology system; and a need for a socio-economic survey of targeted drivers to better outline incentives to entice vehicle modifications.

- PP5: usefulness of a management unit with clearly determined member selection criteria, as well as roles and depth of commitments; the campaign must be implemented continuously and must incorporate new information and feedback; and limited human resources for creation and implementation.

- PP6: high demand for advanced courses or more periodic training; lack of organized training program for technicians and engineers; and limited knowledge and experiences on human resources development.

- PP7: need for a better coordination between agencies and relevant organizations; effectiveness of revenue sharing with traffic police led to high enforcement and good coordination; improve training for traffic police in training management and traffic regulation enforcement; budget system insufficient for the municipality; and TTTO engineers require further training for bus priority measures.

Pilot Project Implementation Issues

29. The following issues were identified during the implementation of the seven pilot projects.

- Initially, the process to identify and award contracts to subcontractors for the implementation of some of the pilot projects took an inordinate amount of time because the entire tendering process had to be developed.
- Collecting the data from various organizations, both in the government and industry, proved extremely time consuming because there was no precedent and organizations saw no benefit in providing the information.
- Capacity for producing useful information is weak and requires each organization to work for a common goal.
- Separation of responsibilities among organizations is ambiguous and requires a better coordination.
- Official certification systems such as designed or certified maintenance and repair shops and their nationally certified technicians in Japan, are inadequate and require systems that expedite development by building up public trust.
- Human resource development is needed in many areas of air pollution control and management.
- Continuous public awareness campaign requires structures to enhance cooperation and feedbacks among related organizations.
- Procedures should be established for data to be disclosed to the extent possible, provided proper explanations are supplied.

Management Action Plan for Air Quality Improvement

30. As Tehran's Ten-Year Action Plan covers those technical measures for mobile sources only, the development of a MAP that focused on management issues was necessary. As a result of its implementation, the Ten-Year Action Plan should accelerate its implementation. A review of the government's current environmental management situation lead to a conclusion that the MAP should not require any major organizational changes as prerequisites for the plan because they would entail enormous difficulties and the outcomes would remain uncertain. Therefore, MAP is designed to affect the current situation as opposed to pursuing a long-term ideal. The main MAP characteristics are: (i) better coordination among various agencies; (ii) better management practices and planning and implementation of human resources development; and (iii) additional individual management-oriented measures that bring about results without large investments.

31. Four Working Groups were established, with about thirty officials from related governmental organizations, NGOs, and counterparts with the JICA Study Team in order to discuss and determine the MAP measures. They also used the lessons learned from the pilot projects to further identify various MAP measures. Approximately 50 measures were initially identified for MAP (Figure ES.3), although only fifteen were identified as priority measures and therefore, were the only measures further analyzed within this Study. The measures, in their order of priority, are listed in Table ES. 3:

Table ES. 3 List of Priority MAP Measures

Priority	Individual MAP Measure
1	Strengthening the Executive Committee Secretariat and Introduction of a Management Information System (MIS) (A1-1, A1-2)
2	Establishing a Database at DOE to Record Emissions from Stationary and Mobile Sources in the Greater Tehran Area (A2-1)
3	Preparation of White Paper on Air Pollution and Setting up Advisory Committee on the Environmental White Paper in Tehran Province (A1-3)
4	Training of Traffic Police and Implementation of Curriculum in the Police Academy (B2-1)
5	Development of a Cross-Ministerial Training Course on Air Pollution Reduction (A1-4)
6	Establishing a Project Management Unit (PMU) to Improve Emissions of Used Cars (B1-2)
7	Introduction of Systematic Internal Training System for Inspection Center Technicians (B1-5)
8	Establishing a Joint Test Laboratory System for Motorcycle Exhaust Emissions (B1-1)
9	Capacity Building of TTTO on Bus Priority Measures and Operation (B2-3)
10	Establishment of Structure for Public Awareness Activities (D-1)
11	Establishment of a Certification Scheme for Retrofitting Devices (B1-3)
12	Improvement of On-street Parking Management and Introduction of Traffic Wardens (B2-2)
13	Establishment of Roadside Measurement System for Idling Emissions (B1-4)
14	Development of Training Course on Human Resources Development for DOE Managers (A1-6)
15	Creation of an Introductory Professional Training Course for New DOE Employees (Professional Course) (A1-5)

Note: Codes in parentheses are corresponding to those in Figure ES.3.

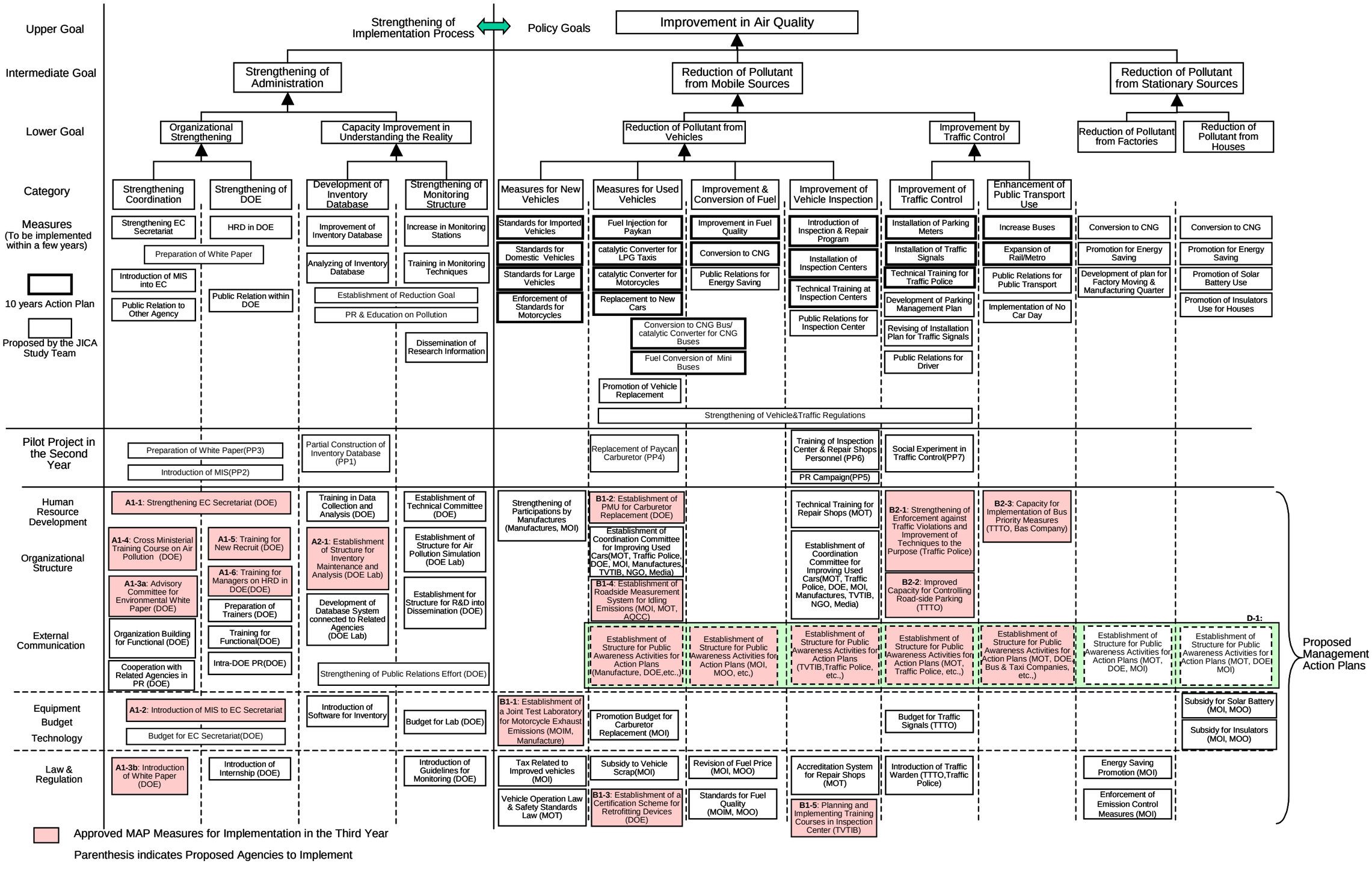

Figure ES. 3 Proposed MAP Measures and Their Relationships with Air Quality Improvement

Implementation of Priority Management Action Plan

32. Due to budgetary constraints, suitability as a JICA-assisted project, and the degree of fit against available resources, human and otherwise, three different levels of JICA Study Team assistance were created to implement MAP. Level I utilized a joint team from the JICA Study Team and DOE-TPD for implementations and included the first two measures, capacity building for the EC Secretariat and developing a stationary and mobile source database. Level II will utilize active consultation by the Joint Team in its implementation and includes the preparation of the White Paper. Level III will receive only progress monitoring by the JICA Study Team through the EC Secretariat and involves all other MAP measures. Level III measures were all assigned to Iranian organizations as the responsible agencies and are expected to implement the individual measures on their own.

Capacity Building for the EC Secretariat

33. Based on the assessment of organizational structure, it was identified that limited supporting functions of the EC Secretariat has prevented the EC from utilizing its full capacity. Currently, the one-person Secretariat can only provide limited supporting services, such as setting agenda, notifying members of EC meetings, and recording discussions. To improve the situation, the MAP measure to strengthen the EC Secretariat calls for installing the following functions to the EC Secretariat:

- Providing information for decision-making including records of past discussions, data, and information relevant to the agenda;
- Monitoring the progress of Action Plans, including the Ten-Year and MAP, using a computer system; and
- Other activities requested by the EC.

34. To install these functions, a computerized Management Information System (MIS) should be introduced to the EC Secretariat through project management software and a database. Project management software will enable the expanded EC Secretariat to centrally compile and analyze information, such as implementation status of the Ten-Year Action Plan and MAP measures. A computerized database for records of EC discussions will also enable the EC Secretariat to produce past discussions on specific topics in a chronological order and to follow up decisions made by the EC. As a result of capacity building of the EC Secretariat, the following outcomes are expected in the EC:

- Enhanced coordination functions;
- Enhanced project monitoring and management capabilities; and
- Enhanced problem solving capabilities.

35. In order to fully obtain these outcomes, it is essential to simultaneously improve individual competency, organizational capacity, and institutional arrangements. In addition, opportunities for individuals to learn from experience should be provided. To transform these approaches into practice, the following arrangements were initially orchestrated to gain momentum.

Table ES. 4 Initial Activities for Capacity Building of EC Secretariat

Items	Description of Activities
Initial Organizational Chart of the Expanded EC Secretariat	- To strengthen institutional aspects, a new EC Secretariat organizational chart was initially prepared and approved by the EC and the Director General of DOE-TPD with new units, roles, increased staff, and their job descriptions before the start of the implementation.
Training to Enhance Individual Skills	- To strengthen individual competency including skills, knowledge, and attitude, local and Japanese consultants provided training; and - Training was designed to meet specific demands and provided to staff who will use the new skills.
Weekly EC Secretariat Meetings	- To link enhanced individual competency with organizational strengthening, EC Secretariat meetings were held two times a week; and - The purpose of these meetings was to strengthen leadership and communication among members, share information and goals, change attitudes of members to enable more group work, and set managerial procedures of the EC Secretariat.
Opportunities for Consultation	- To enhance top management and users' understanding of the necessity to expand the EC Secretariat, opportunities were prepared for the EC Secretariat members to show their achievements; and - This also increases the confidence of individual EC members, and organizational incentives.
Facilitating Improvements.	- Based on these initial designs, capacity building for the EC Secretariat has started. In the course of the implementation, the JICA Study Team members have worked as facilitators to guide the EC Secretariat in the right direction, providing opportunities to learn by doing, information, advice, and training.

36. The results of implementing this MAP measure are as follows:

37. Established Organizational Structure. The EC Secretariat has worked as a single organization in a defined role for each unit and staff member and defined managerial procedures. Initially, two newly established units were created in the EC Secretariat. They were the Action Plan Management Unit and General Affairs Unit. The Action Plan Management Unit is responsible for monitoring the progress of the Ten-Year Action Plan and the MAP. The General Affairs Unit is responsible for managing the database that holds records of discussions of EC meetings, as well as issuing newsletters. An acting director will supervise the EC Secretariat's daily work and the two units will report work progress to him. The acting director is also responsible for coordinating among related organizations and troubleshooting to smoothly accomplish jobs of the EC Secretariat.

38. The number of required staff and job descriptions for each position were also specified and a total of seven people were assigned to the Secretariat, including the director and acting director. After a few months of operation, the new EC Secretariat realized that additional units and personnel would be necessary. They therefore proposed Air Quality Monitoring and Research Units. The former is responsible for disseminating air quality monitoring data and analyzing and graphically presenting air quality statistics. The latter is responsible for reviewing specific plans on air pollution reduction and doing research requested by the EC and as requires will vary, staffing in this unit will be flexible. The new organizational chart is shown in Figure ES. 4:

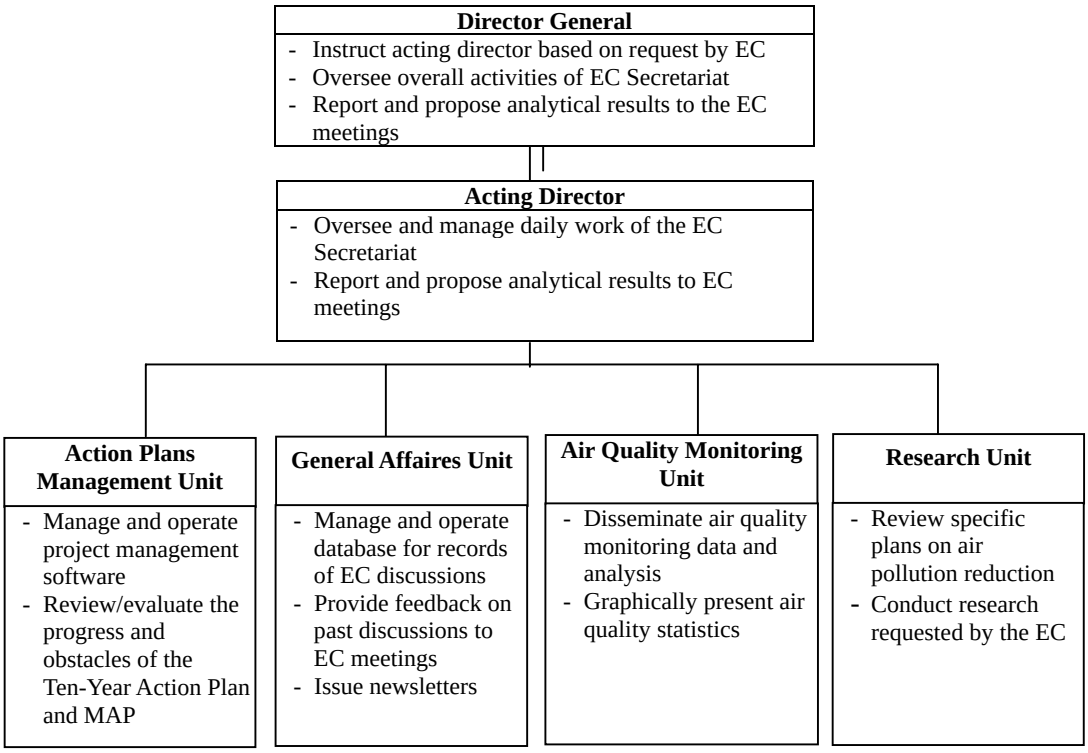

Figure ES. 4 Proposed Expanded Structure of the EC Secretariat

39. Installed New Functions. Feedback functions of EC discussions at EC meetings and monitoring functions of action plans were installed in the new EC Secretariat structure. In addition, the EC Secretariat succeeded in issuing newsletters regularly.

40. Feedback functions of EC discussions enabled the EC Secretariat to deliver relevant past discussions to EC members at meetings through use of a database so that EC members could avoid repeat discussions. The managerial procedures for taking the meeting minutes, entering them into the database, posting them, and utilizing the searching functionality were set. This ensures that for any topic to be debated at an EC meeting, repeated discussions can be avoided and EC members can take a more constructive approach, not simply repeating past discussions. Though the database was originally developed to avoid repeated discussions at EC, other purposes and future directions have evolved during the implementation phase. Another use of the database was to help set specific agenda or sub-agenda items.

41. Monitoring functions of action plans were also installed. Questionnaires were prepared and delivered to collect necessary information to monitor about 36 programs from the Ten-Year Action Plan and 15 MAP measures. Based on the questionnaire survey and interviews, the EC Secretariat analyzed the current status and obstacles and proposed suggestions to solve individual project problems. The results were summarized in a designated format and they will be presented to EC meetings in the near future. In addition, MS Project, which was part of the pilot project, was utilized for action plan monitoring. All relevant EC Secretariat personnel were trained on the application and the training emphasized the kind of information that is required for monitoring the Ten-Year Action Plan and MAP measures, as well as how to use MS Project. Because of the training, the EC Secretariat faced no difficulties in adding the results of the questionnaire into MS Project and generating initial project plans for some projects. However, because of the weak legal status of the EC Secretariat and the new monitoring approach, it was difficult to collect the requested information from all related organizations. The EC Secretariat realized the necessity of guidelines to use as a source of the

EC Secretariat's authority to monitor action plans and has started preparing a draft of the guidelines. The guidelines will be presented to the EC for approval.

42. In addition to the aforementioned two functions, the EC Secretariat has succeeded in publishing newsletters at the end of every month from June through November 2004. Though they originally aimed to disseminate activities of the Study to related organizations, the EC Secretariat has attempted to expand news sources in preparation for changes to the newsletter to include notices and information from the EC Secretariat.

43. Based on these achievements, the EC Secretariat realized the necessity of a new DOE-TPD organizational chart that clarifies the location of the EC Secretariat within the organization. If the EC Secretariat is not clearly located in the official DOE-TPD organizational chart, there will continue to be a lack of clarity regarding who is responsible for the budget and who should be giving and receiving instructions. This unstable condition would make it difficult to maintain the expanded EC Secretariat. To cope with this issue, the EC Secretariat prepared the new DOE-TPD organizational chart as well as new structure of the EC Secretariat through its initiatives and received approval from the Director General of DOE-TPD. The chart will be soon sent to the Budget and Organizational Directorate of DOE.

Future Direction of the EC Secretariat

44. Building an Institutional Foundation. In the short-term, the EC Secretariat should make a continuous effort so that the proposed new organizational chart and the draft guidelines can be approved. The guidelines are important from an institutional viewpoint for the EC Secretariat to obtain more authority to fulfill its activities of monitoring action plans. As the draft has already been prepared, the EC Secretariat should submit the draft to be approved by the EC.

45. Upgrading Feedback Loop. The EC Secretariat should upgrade the current database so that they can play a more positive role in setting the agenda and following-up on discussions and approvals.

46. Continuous Efforts to Monitoring Action Plan as Routine Work at EC. As for action plans monitoring, after the approval of the guidelines, the EC Secretariat should hold workshops, assisted by local consultants, for officers of related organizations who are responsible for responding to the questionnaire. The purpose of the workshops is to demonstrate how to fill in the questionnaire and explain how data will be used to the relevant officers. After these arrangements are completed, the EC Secretariat should start monitoring actions plans fully based on the guidelines. The results should be disseminated at EC meetings.

47. Changing the Focus of the EC Secretariat Newsletter. Continuous efforts are recommended to expand their network for news sources in preparation of the new EC Secretariat newsletters. In addition, the EC Secretariat should be responsible for parts of the White Paper in which EC activities are mentioned.

48. Establishing a Research Unit. After the above tasks are put on the right track, the EC Secretariat should undertake new functions such as a research function, which was proposed by the new structure of the EC Secretariat. The research function will enhance the coordination function of the EC Secretariat as a third party.

49. Utilizing External Experts. Considering that the modified Secretariat is a totally new concept in Iran, DOE-TPD should consider utilizing external experts to support these actions based on progress monitoring of the actions above. The experts should focus on guiding the

EC Secretariat to implement the above actions. Experts who know the functions of the Secretariat well and have facilitation capabilities are desirable.

Preparation of Stationary and Mobile Sources Inventories

50. The project activity for Inventory Preparation was initially launched as a pilot project under the framework of MAP formulation during the second year of this Study. The project evolved into two distinct, but closely interrelated subcomponents, the Stationary Emission Sources Inventory Preparation (SESIP) and the Mobile Emission Sources Inventory Preparation (MESIP), which used comparative institutional examination pertaining to air pollution management systems between Iran and Japan. The pilot project identified major issues including (i) limited accessibility to relevant information and data; (ii) gap in human resources capacity; (iii) unclear focal point for mobile source inventory; and (iv) unclear role of DOE-TPD Laboratory for mobile sources emission management.

51. To facilitate the implementation, a task team for emissions inventory preparation was organized within the DOE-TPD laboratory. A task manager, who was responsible for overall operations, was assisted by one counterpart for stationary sources and two counterparts for mobile sources, and headed the team.

Stationary Emission Sources Inventory Preparation

52. The project objectives were to enhance DOE-TPD's capacity in managing emission sources within GTA by using the database as a decision support tool and to improve DOE-TPD's capacity to assess air management intervention and formulate a plan of action. The long-term objective is to enhance environmental compliance of factories and promote economic development by enhancing investments with reduced risks and uncertainties for environmental remedies.

53. To implement DOE's duties, DOE-TPD developed an application for technical appraisals prior to construction of factories. The application format enables DOE to obtain an overview of the proposed factory's operation prior to construction. Although it has comprehensive information on proposed factories including various aspects of environmental issues, it lacks detailed information on individual facilities as compared with the notification format used in Japan, such as the types of fuels to be used and control devices.

54. *Issues on stationary Sources Inventory*: Limited information on facility. DOE-TPD has a limited ability to identify potential problems at the preconstruction stage due to limited information on new facilities because of the application format. The current air pollution permit system assesses proposed industrial operations primarily on industrial site selection criteria instead of environmental compliance of the proposed operations. This transfers localized air pollution problems elsewhere allowing non-compliance to prevail.

55. Paper based management. DOE-TPD maintains an archive of factory information based on the applications, records of inspection, and other available information. The archive stores more than 5,000 files in hard copy format, which impedes DOE-TPD from effectively and efficiently managing pollution generated by factories and intervening to improve air quality.

56. *Measures Taken*: The DOE-TPD application format was modified to enable DOE to collect detailed information on facilities and enhance DOE's ability to judge environmental compliance of proposed facilities in preconstruction period. The new format was specifically designed to (i) locate and identify sources of emissions; (ii) include separate information on

each facility; (iii) enable emissions estimates; (iv) serve as basis for simulation analysis; and (v) apply to facilities currently in operation in Tehran. Additionally, a computer database was designed and constructed based on the new application format, which was expected to enable quick access to information and targeted intervention on stationary emission sources. A schematic diagram of the major issues of the measures to address them is presented in Figure ES.5.

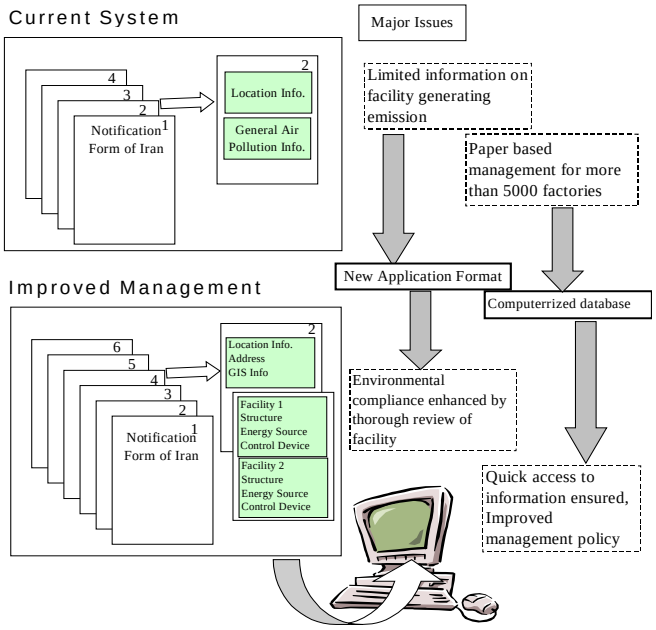

Figure ES. 5 Schematic Diagram of Issues and Measures

57. *Future Directions for Stationary Sources Inventory*: As the database construction is in its preliminary stage, various issues still remain prior to the full development of the stationary emissions sources inventory. Assessing the available factory files and the current practice and data encoding of the archive is expected to be complete by the end of 2005. Furthermore, additional data coverage is needed to fill the gaps between the archived information and the new format, which is expected to be complete over all of Tehran Province by the end of 2008.

58. Institutionally, the task team created by the project should be incorporated into the organizational structure of DOE-TPD. High staff stability must be maintained and they must have clear tasks and responsibilities. Financially, to maintain the inventory, annual budgets must be earmarked to operate and maintain the stationary inventory, plus allow for any expansions in team capacity. All of the information must be closely communicated with the decision makers at the EC and DOE, at least twice per year and during these times, guidance can be provided where needed. In the medium-term, as similar to the mobile inventory discussed below, a more cooperative environment between the EC and DOE-TPD laboratory should be created and simulation modules should be incorporated to instill a more rigorous decision-making system.

59. In both the mobile and stationary inventory project, to support future directions, DOE-TPD should consider utilizing external experts, such as local consultants, to monitor the project, facilitate activities, and provide demand-driven technical assistance to ensure timely managerial and technical intervention. The external experts are also expected to adopt an iterative and flexible approach to bolster local initiatives and respond to changing needs and changing perceptions.

Preparation of Mobile Emission Sources Inventory

60. The mobile source emissions inventory has not been updated since 1997. Currently, the emission amounts by type of pollutant and sources are based on 1994 data. As the situation has changed dramatically, including the tripling of the number of passenger vehicles, the emissions estimations should be updated.

61. *Issues on Mobile Sources Inventory*: The periodic collection of inventory information is essential to update the inventory. Therefore, an inventory update system should be established, in which the required inventory information is identified and its availability is clarified. For the inventory update, it is required to revise the vehicular emission factors, estimate the emissions amount using the latest information, and build the emissions inventory database in a geographic information system (GIS). It is desirable that DOE-TPD laboratory staff be able to execute inventory preparation and maintenance. However, cooperation with a local consulting firm will be necessary to ensure efficiency. Therefore, the DOE-TPD laboratory staff must have the capability to supervise inventory maintenance and to control quality of the work performed.

62. *Measures Taken*: Establishment of Inventory Update System. The objectives are to establish a system that assists DOE-TPD laboratory staff in accessing and obtaining the periodic updates for the inventory. The team clarified a list of information to be collected, its source (s), and the method of its acquisition. The procedure of inventory updates established is given in Figure ES. 6:

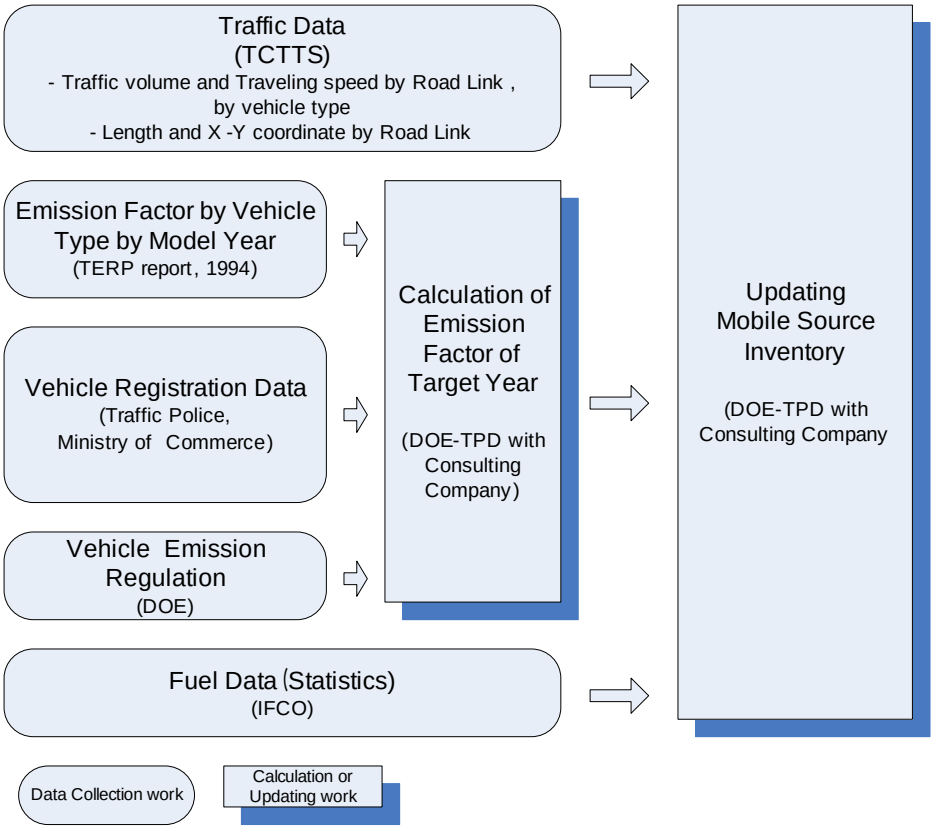

Figure ES. 6 Identified Inventory Update Procedure

63. Technical Workshop. Objectives of technical workshops are to strengthen the technical capabilities of DOE-TPD's laboratory staff and counterparts in order to execute clear instructions to the consulting firm for inventory preparation and quality control. Guidebooks for Mobile Sources Inventory, which are available online, were created for inventory preparation and updates in cooperation with the counterparts and show a basic approach and methodology for inventory preparation, emissions factor estimation, and validity checks, as well as the basic knowledge of alternative vehicle emissions methods (catalytic converters, enforcement of regulations, expansion of restricted areas) led by mobile source inventory. A five-week technical workshop for DOE-TPD laboratory staff and counterparts was executed in September 2004 using the guidebooks. In the first half, the basic approach and methodology of inventory preparation and updates such as data collection and emissions factor estimation were discussed. In the second half, the vehicular emissions factors and road emissions were calculated by trainees using the new knowledge and methodology. To enhance technical transfer, an introduction of the workshop was made by the counterpart. In addition, the counterpart conducted data updates and case studies by using the results of the pilot project as preparatory work for the technical workshop, assisted by a JICA Study Team member.

64. *Future Directions for Mobile Sources Inventory*: In this Study, DOE-TPD Laboratory and the JICA Study Team provided the latest Mobile Source Inventory in cooperation with AQCC. In addition, the system for continuous inventory updates was provided and human resources were strengthened. In the future, the EC should execute air pollution management in cooperation with the DOE-TPD Laboratory. The DOE-TPD Laboratory should assist EC policy making through data preparation and the submission of expert judgment related to the mobile sources inventory, similarly to the air quality monitoring section. For this reason, an inventory section should be established in DOE-TPD Laboratory. When the inventory section of DOE-TPD Laboratory updates the mobile sources inventory continuously, it would then be possible to implement the Ten-Year Action Plan using the latest inventory of mobile source.

65. Similar to the stationary inventory, the new task team should be incorporated into the organizational structure of DOE-TPD. Budgets must be earmarked and institutional tasks and responsibilities must be clearly outlined. The new mobile source information should also be provided to the EC and DOE for decision-making use. In the medium-term, a more cooperative environment between the EC and DOE-TPD Laboratory should be created where central decision-makers are empowered with quantitative analytical tools. Simulation modules should also be incorporated into the air quality management system by exposure, damage, and cost-benefit analysis modules to enable a more rigorous air quality analysis. As this will be useful in other cities, both the stationary and mobile inventory projects should be closely monitored to understand best practice and lessons learned.

66. As noted above in the stationary inventory summary, external experts are necessary for project monitoring, facilitating activities, and providing high-level expertise.

Progress on Other MAP Measures

Creation of a White Paper on Air Quality

67. The White Paper on Air Quality written by the DOE-TPD was successfully distributed in Farsi at the 5th Seminar to be held on December 4, 2004. Progress on this project has been somewhat delayed due to data accuracy for collected data. This White Paper was based on a draft paper in English that was completed as a pilot project. The preparation was made considering the following points:

- All data should be accurate because it will be available to the public;
- Comments from the JICA advisory committee should be reflected;
- All data should be updated; and
- Comparative analysis of air quality should be newly added.

68. Though DOE-TPD has faced no major difficulties, they plan to take some measures to improve the process to ensure annual updating. First, to institutionalize the process of preparing the White Paper, the Public Relations Division of DOE-TPD or EC Secretariat will be assigned as the main point of responsibility. Second, an official channel or system to collect and update information and data will be established. Third DOE-TPD plans to expand the coverage of the White Paper to all environmental issues, by establishing an advisory committee after the careful evaluations of reactions to the White Paper when it is distributed at the seminar.

Other MAP Measures

69. As all other MAP measures had only JICA Study Team monitoring, the same level of progress has not been achieved on the remaining measures as the three discussed above. Below is an update on some of the MAP measures; no progress has been made on the others that are not listed here.

- AQCC developed an implementation plan for Roadside Measurement System for Idling Emissions and presented it to the EC Secretariat;
- Tehran Traffic and Transport Organization (TTTO) plans to review two on-going pilot projects for city wide expansion, one of which was implemented by the Study, and prepare new legislation to introduce a traffic warden system;
- TVTIB showed a strong interest in implementing periodical training programs to the EC Secretariat;
- According to DOE officers, an established committee tasked with scrapping and renewing 200,000 passenger cars can also work as a Project Management Unit to retrofit used cars; and
- According to MOIM, a test facility for motorcycle exhaust emissions will start operation soon.

70. To prompt the implementation, DOE-TPD has considered issuing a letter from the Head of DOE to related organizations, asking them to prepare detailed implementation plans of the MAP, as it was approved by the EC.

Recommendations

71. The Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area was implemented in three phases. In Phase I, the current situation was reviewed and short-term pilot projects were proposed. Phase II focused on developing the MAP through the implementation of the short-term pilot projects, and discussions in Pilot Project Management Units (PPMUs) and Working Groups. Following these two phases, Phase III implemented and monitored the progress of the 15 priority MAP measures. During the entire study period, capacity building of counterparts was also emphasized through various arrangements.

72. Considering that the MAP was developed as a set of soft measures to solve institutional and organizational issues, resulting in accelerating the Ten-Year Action Plan, the 15 priority

MAP should be fully implemented with the same level of attention as the Ten Year Action Plan. To utilize the MAP, DOE-TPD should take following actions.

73. Follow-up of Future Directions. Three MAP measures out of 15 priority measures have been implemented within this Study. The three measures are (i) capacity building for the EC Secretariat; (ii) inventory preparation for stationary and mobile emission sources; and (iii) the preparation of White Paper. To ensure that these MAP measures continue moving forward in DOE-TPD, they should follow up with the future directions that were mentioned above.

74. Providing Stable Status for Counterparts. Capabilities of assigned counterparts were enhanced and they were equipped with necessary skills, knowledge, and work attitude to operate the three MAP measures mentioned above. Thus, to support the follow-up actions, DOE-TPD should incorporate all counterparts into its organizational structure, mainly within the Laboratory or EC Secretariat.

75. Promoting Other MAP Measures. DOE-TPD should follow up with a letter sent by the Head of DOE to related organizations in order to obtain detailed implementation plans of the MAP measures because they have already been approved by the EC.

76. Monitoring the Progress of All MAP Measures. The EC Secretariat should monitor the progress, analyze obstacles of all MAP measures, and present the findings to the EC in the same manner as the Ten Year Action Plan.

77. Application of the MAP to Other Polluted Cities. Based on lessons learned from the project and above recommendations, DOE-TPD should assist other polluted cities to replicate the GTA MAP for their own purposes. This should occur via the creation of a DOE-TPD mobile technical transfer team, which will include counterparts and DOE-TPD staff.