APPENDIX

Appendix A Further Explanation of Tasks Performed Based on Original Terms of Reference

(1) Phase I: Study of Current Status

Four sub tasks for Phase I activities are defined in the Term of Reference: (i) Collection of existing data related to the Study, (ii) Review of current status of air pollution control activities, (iii) proposing priority program(s) of the Management Action Plan, and (iv) Identification of the shortcomings and basic needs of Phase II and Phase III of the study.

In response to sub task (ii), regulatory and institutional framework was reviewed in Chapter 2. The review covered laws and regulations, Department of Environment, Executive Committee and other relevant organizations. In addition, in Chapter 3, air quality management in Tehran was also reviewed. This included air quality monitoring system, air quality standards, stationary and mobile emission sources management, and public awareness programs.

In response to sub task (iv), through the review work, the preliminary analysis of management issues were made and the results were summarized in last sections of Chapter 2 and 3. This analysis became a basis of the implementation of pilot projects and preparation of the Management Action Plan (MAP) in Phase II and the implementation of the MAP in Phase III.

The study also covered sub-task (iii) by proposing nine priority programs which were renamed as pilot project later. Finally, seven pilot projects were selected and implemented in Phase II. The details are illustrated in Chapter 4.

To complete the analysis, existing data related to the Study were collected and the data are shown in relevant Chapters.

(2) Phase II: Development of the Management Action Plan

As the scope of the study mentioned, after the completion of Phase I, the detailed content of the scope of the Study within Phase II and Phase III was discussed, determined and included in the Term of Reference.

Based on Term of Reference, management issues and directions for improvement were identified through the implementation of pilot projects (Chapter 4). At the same time, to evaluate the implementation of pilot projects, Pilot Project Management Units (PPMUs) and Working Groups (WGs) were established (Chapter 5). After discussions within PPMUs and WGs, over 50 MAP measures were proposed and 15 priority MAP measures were selected based on established principles of MAP formulation and a logical framework (Chapter 5). MAP includes plans of strengthening public awareness and plans of capacity building.

(3) Phase III: Supervision and Evaluation of the Implementation of the Management Action Plan

This part consists of 4 sub-tasks: (i) support for the implementation of the MAP, (ii) Supervising and evaluation of the implementation of the MAP and (iii) Proposal of corrective measures for the implementation of the MAP.

As mentioned in Chapter 6, three different kinds in terms of level of assistance provided by the JICA Study Team, among the 15 priority MAP measures. The first category is those involving JICA Study Team and DOE Tehran as a joint team for its implementation. One is the

strengthening of the EC secretariat of the Executive Committee. Another one is the establishment of a mechanism to prepare a comprehensive emission source inventory. The second category is one that will receive active consultation by the Joint Team in its implementation. The preparation of White Paper on Air Pollution falls into this category. The third category is those that will receive monitoring of their progress only. Responsible agencies were expected to implement individual management action plan on their own and the Joint Team monitored the progress and report to the EC. Through the implementation and supervision, evaluation was done and recommendations were made in Chapter 7.

Appendix B Seminar Records

B1 Introduction

With support from the JICA Study Team, DOE-TPD organized seminars during the Study period to broadly disseminate contents and activities of the Study as well as to obtain comments and suggestions to be reflected to the subsequent Study. Five seminars were held on important timings of the Study, and approximately a total of 590 people attended from various organizations. Presentations were made by the DOE-TPD officials, study team members, the advisory committee members for the Study, JICA expert, and people from related organizations in Iran. A question and answer session was conducted after each presentation and interpreters were arranged. A brief summary of the seminars is shown in Table B.1 and the minutes of the seminars are attached in this Appendix.

The first seminar was held on October 6, 2002 to introduce the overall content and procedures of the Study and to gain consensus from people and organizations concerned. Japan's experience on air pollution control was also introduced.

The second seminar was held on February 9, 2003 to introduce the current situation and activities in Tehran and Japan for alleviating air pollution and form a consensus on the framework and procedures for formulating the MAP. Topics of the pilot projects, which played an important role in formulating the MAP, were also introduced.

The third seminar was held on October 5, 2003 to report on the progress of the seven pilot projects. Iranians did most presentations.

The fourth seminar was held on February 8, 2004 to present management issues found from the seven pilot projects, to introduce the MAP and to obtain comments and suggestions on the MAP. The contractors of the pilot projects gave presentations on the pilot projects and a JICA expert made a presentation on air pollution mechanism in the Tehran City area.

The fifth seminar was held on December 4, 2004 to present the MAP and its measures in detail and to report on improvements made through implementing some of the MAP measures.

Table B.1 Summary of Seminars

Date and Place	Topics and Presenters	Attendants
1st Seminar October 6, 2002 Amphitheater of DOE-TPD	• Study Outline (Mr. Motomura, Study Team) • Japan's Experience on Air Pollution (Prof. Hirayama, Study Team) • Air Pollution Monitoring in Tehran (Dr. Pour-farhadi, Air Pollution Monitoring Stations, DOE-TPD)	Approximately 50

Date and Place	Topics and Presenters	Attendants
2nd Seminar February 9, 2003 Conference Hall of SAPCO	• Management Models (Prof. Hirayama, Study Team) • Iranian Situation in Air Quality Control Administration (Dr. Hojjat, Deputy Head of DOE) • Relationship between Local Government and Individual Emission Sources (Prof. Saruta, Study Team) • Urban Planning Concept and Stationary Emission Sources (Dr. Pourfarhadi, DOE-TPD) • Local Area Pollution Control Mechanisms including Monitoring in Japan (Mr. Inagaki, Advisory Committee Member of the Study) • Existing Ambient Monitoring Network in Tehran (Dr. Pour-farhadi, DOE-TPD / Mr. Rashidi, AQCC) • Vehicular Emission Reduction- Technical Options (Mr. Numajiri, Study Team) • Effort by Iranian Motor Industry and Other Industries (Mr. Danesh-Fahim, Dep. Head, IDRO Automotive Industries) • Traffic Control Options (Dr. Kuranami, Study Team) • Traffic Control in Tehran (TTCC) • Suggested Program for Improving Air Quality Control in Tehran (Mr. Motomura, Study Team/ Mr. Hakimian, National Project Director of DOE-TPD)	Approximately 150
3rd Seminar October 5, 2003 DOE Pardisan	• Inventory Survey (PP1) (Dr. Pour-farhadi, Air Pollution Monitoring Stations, DOE-TPD) • Introduction of MIS (PP2) (Ms.Khaje-vandi, DOE) • Preparation of White Paper (PP3) (Mr. Hakimian, National Project Director of DOE-TPD) • Introduction of Remodeled Carburetors (PP4) (Mr. Izanloo, Zamiad) • Public Awareness Campaign (PP5) (Ms. Jamali, NGO) • Pilot Training of Inspection Centers (PP6) (Mr. Pezeshk-pour, Inspection Center) • Introduction of Traffic Control System (PP7) (Mr. Mohammadi, Counterpart of Study Team) • From Here to Management Action Plan (Mr. Motomura, Study Team /Mr. Hakimian, National Project Director of DOE-TPD)	Approximately 100

Date and Place	Topics and Presenters	Attendants
4th Seminar February 8, 2004 Olympic Hotel	• Air pollution mechanism (Mr. Shirai, JICA Expert) • Proposed MAP (Mr. Motomura, Study Team) • Omitting Concentrated Emission from Diesel Engines in Urban Terminals (Dr. Savadkoohi, Iran Automotive industries Consulting Engineers) • Inventory Survey (PP1) (Dr.Rashidi, AQCC/ Ms.Ghazarian, IOA) • Introduction of MIS (PP2) (Dr. Jafari, Tehran University) • Preparation of White Paper (PP3) (Dr. Ferdowsi, ZIST SEPEHR) • Introduction of Remodeled Carburetors (PP4) (Dr. Rashidi, AQCC) • Public Campaign (PP5) (Ms. Motlagh, Pars ashian) • Pilot Training of Inspection Centers (PP6) (Mr. Panahi and Mr. Seif, SAIPA YADAK) • Introduction of Traffic Control System (PP7) (Mr. Sedighi, TTTO)	Approximately 160
5th Seminar December 4, 2004 DOE Pardisan	• Objectives, Framework and Process of MAP Formulation (Mr. Hakimian, National Project Director of DOE-TPD) • Comparative Institutional Analysis (Mr. Motomura, Team leader of the JICA Study Team) • Strengthening of EC Secretariat (Mr. Vahdati, DOE-TPD) • Inventory of Emission Sources (Dr. Pour-farhadi, DOE-TPD / Ms. Nadimi and Mr. Kavani, counterpart team) • Preparation of White Paper (Mr.Hakimian, National Project Director of DOE-TPD)	Approximately 130

B2 First Seminar

(1) Agenda

Date: October 6, 2002
Place: Amphitheater of Tehran Provincial Directorate, Department of the Environment

09:00-09:15	Reciting of the Versus of Holly Qoran	
0915-09:30	Opening Remarks	Mr. Pirasteh, Director General, DOE-TPD
09:30-10:00	Study Outline	Mr. Motomura, Team Leader of the JICA Study Team
10:00-10:30	Questions and Answers	
10:30-11:00	*Coffee Break*	
11:00-11:30	Japan's Experience on Air Pollution	Mr. Hirayama, JICA Study Team
11:30-12:00	Questions and Answers	
12:00-12:15	Air Pollution Monitoring in Tehran	Dr Pourfarhadi, Director, Air Pollution Monitoring Stations, DOE-TPD
12:15-12:30	Questions and Answers	
12:30-13:00	Closing Remarks	Dr. Shafie-Pour, Advisor to the Head of DOE in International Affairs
13:00	*Lunch*	

(2) Participants

A total of approximately 50 people from the DOE HQs, DOE-TPD, AQCC, IRIMO, Vahed Motor Co., Samandehi Co., Iran Khodro Engine Research Co., NIOC, Youth Green Group, Iranian Fuel Conservation Organization, and Women Society Against Environmental Pollution attended the seminar.

(3) Summary of Questions and Answer Sessions

Study Outline (Presentation by the JICA Study Team)
Q: It would be difficult to apply the ISO 14001 system to the Study, as many people such as the government, NGOs, and the public will be involved.
A: The idea of ISO 14001 will be applied to the Study, not the system itself.
Q: How do you coordinate the Study with the Ten Year Action Plan?
A: The Study will be conducted based on the Ten Year Action Plan, so that it will be in consistent with the Ten Year Action Plan.
Q: The Study period of three years sounds too long.
A: The Study takes time as it involves many people such as the government and public.
Q: The Study contents for the second and third phases are not clear.
A: They will be decided in the course of the Study.

Japan's Experience on Air Pollution (Presentation by the JICA Study Team)
Q: What was the role of the public in working on air pollution problems in Japan?

A: The role of the public was very important. For example, when the government planned establishment of a petrochemical complex, residents in the vicinity objected to the plan, which made the government to change the plan.
Q: What are the similarities between Tehran and Tokyo?
A: With regard to air quality issues, the use of automobiles in Tehran and Tokyo is very high, and air pollution due to exhaust gas from those automobiles is a serious problem. A for social and economic conditions, the population density and level of economic activity are very high in both areas.

B3 Second Seminar (Agenda)

Date: February 9, 2003
Place: Conference Hall of SAPCO

8:30-9:00	Prayer	
	Opening Address	Mr. Veysseh, Chairman of IDRO
	Keynote Address	Mr. Yukihiro Nikaido, Minister Counsellor, Embassy of Japan
Session I:	**Session Chairman: Mr. Hakimian**	
9:00-9:50	Management Models	Mr. Hirayama, JICA Study Team
	Iranian Situation in Air Quality Control Administration	Dr. Hojjat, Deputy Head of DOE
	Questions and Answers	
9:50-10:10	*Coffee Break*	
10:10-11:00	Relationship between Local Government and Individual Emission Sources	Mr. Saruta, JICA Study Team
	Urban Planning Concept and Stationary Emission Sources	Dr Pourfarhadi, Director, Air Pollution Monitoring Stations, DOE-TPD
	Questions and Answers	
11:00-11:50	Local Area Pollution Control Mechanisms Including Monitoring in Japan	Mr. Inagaki, Advisory Committee member of the Study
	Existing Ambient Monitoring Network in Tehran	Director, Air Pollution Monitoring Stations, DOE-TPD/ Mr. Rashidi, AQCC
	Questions and Answers	
11:50-13:00	*Lunch Break*	
Session II:	**Session Chairman: Dr. Hojjat**	
13:00-13:50	Vehicular Emission Reduction- Technical Options	Mr. Numajiri, JICA Study Team
	Effort by Iranian Motor Industry and Other Industries	Mr. Danesh-Fahim, Deputy Head, IDRO Automotive Industries
	Questions and Answers	
13:50-14:40	Traffic Control Options	Dr. Kuranami, JICA Study Team
	Traffic Control in Tehran	Representative from TTCC
	Questions and Answers	

Session III:	**The Iran-JICA Collaboration**	
14:40-15:30	Suggested Program for Improving Air Quality Control in Tehran	Mr. Motomura, Team Leader of the JICA Study Team/ Mr. Hakimian, National Project Director
	Questions and Answers	
	Closing Remarks	Mr. Pirasteh, Director General, DOE-TPD

MINUTES OF MEETING
BETWEEN
THE TEHRAN PROVINCE DIRECTORATE
OF
DEPARTMENT OF THE ENVIRONMENT
THE ISLAMIC REPUBLIC OF IRAN
AND
THE JICA STUDY TEAM
FOR
THE THIRD SEMINAR
OF
THE STUDY
ON
STRENGTHENING AND IMPROVING AIR QUALITY MANAGEMENT
IN THE GREATER TEHRAN AREA
IN THE ISLAMIC REPUBLIC OF IRAN

7 October 2003

Mr. M. H. PIRASTEH
Director General,
Tehran Province Directorate,
Islamic Republic of Iran
Department of the Environment

Mr. Yuichiro MOTOMURA
Team Leader,
JICA Study Team for the Study on
Strengthening and Improving Air Quality Management
in the Greater Tehran Area in the Islamic Republic of
Iran

Mr. Kiyotaka MATSUBA
Chairman,
JICA Advisory Committee, as Witness

The meeting between the Tehran Province Directorate of the Department of the Environment, Islamic Republic of Iran (hereinafter referred to as DOE-Tehran), and the JICA Study Team (hereinfater referred to as Team) was held on 5 October 2003 according to the following agenda:

1 Opening of the meeting;
2 Discussion on the Third Seminar;
3 Closing of the meeting.

The meeting was presided by Mr. M.H.Prasteh, the Director General of DOE-Tehran. The list of attendants is attached to this document.

1. Both sides acknowledged the success of the third seminar. The list of attendants is attached to this document as well as the agenda of the seminar.

2. Both sides agreed that issues raised in the seminar requiring further actions shall be given due attention and effort to produce solution. Comments expressed in the seminar is attached to this document.

LIST OF SEMINAR ATTENDANTS

Iranian Side

Dr. Y. HOJIAT	Deputy Head, DOE
Dr. M. SAHFIE-PORU	Senior Advisor to the Head of DOE
Mr. M. H. PIRASTEH	Director General, DOE-Teheran
Mr. K. POURFARHADI	Chief of Labs of Air and Water Quality, DOE-Teheran
Mr. A. H. HAKIMIAN	Senior Expert, DOE-Teheran
Mr. Atsushi SHIRAI	JICA Air Quality Management Expert

Others: Refer to the attachment

Japanese Side

JICA

Mr. Kiyotaka MATSUBA	Chairman, JICA Advisory Committee
Mr. Takashi INAGAKI	JICA Advisory Committee
Mr. Tatsuya ASHIDA	Second Development Study Division, Social Development Study Department

JICA Study Team

Mr. Yuichiro MOTOMURA	Team Leader
Mr. Ryuichi YANAI	Deputy Team Leader
Mr. Minoru HONDA	Stationary Source Emission Control
Mr. Chiaki KURANAMI	Mobile Source Emission Control
Ms. Nami TANAKA	Public Awareness Promotion

SEMINAR AGENDA

OPENING SESSION

09:00-09:15	Opening Address	Mr. Pirasteh, TPD
09:15-09:30	Opening Address	Dr. Hojiat, DOE
09:30-09:45	Opening Address	Dr. Shefie-pour, DOE
09:45-10:15	Keynote Address	Mr. Matsuba, JICA

MAIN SESSION: Session Chairman: Mr. Hakimian

10:15-10:30	Inventory Survey (PP1)/Q&A	Dr. Pour-Fardi, TPD
10:30-11:00	*Coffee Break*	
11:00-11:15	Introduction of MIS (PP2)/Q&A	Ms. Khaje-vandi, DOE
11:15-11:30	Preparation of White Paper (PP3)/Q&A	Mr. Hakimian, TPD
11:30-11:45	Introduction of Traffic Control System (PP7)/Q&A	Mr. Mohammadi, Counterpart of JICA Team
11:45-12:00	Public Awareness Campaign (PP5)/Q&A	Ms. Jamali, NGO
12:00-12:15	Pilot Training of Inspection Centers (PP6)/Q&A	Mr. Pezeshk-pur, Inspection Center
12:15-12:30	Introduction of Remodeled Carburetors (PP4)/Q&A	Mr. Izanloo, IPCO
12:30-13:00	From Here to Management Action Plan/Q&A	Mr. Motomura/ Mr. Hakimian, JICA/TPD
13:00-13:15	Closing Speech	Mr. Pirasteh, TPD
13:30-	*Lunch*	

SUMMARY OF COMMENTS MADE IN THE THRID SEMINAR

Mr. Pirasteh:

Firstly, he expressed his thank to all attendants in the 3rd seminar. Then, he explained about the air pollution dilemma in GTA. He said some years ago, Executive Committee have begun its activity and follow up this problem and its approvals. Tomorrow (Oct. 6, 2003) is the 119th meeting of Executive Committee. He explained about the cooperation between DOE & JICA Study Team and their responsibility in this project.

Consequently, 7 Pilot Projects (Term of References) among 9 Pilot Projects that are prepared by JICA Study Team and presented in the Executive Committee meeting are accepted. Therefore, it leads us to have a Management System. He also mentioned the name of theses Pilot Projects and described briefly about Working Groups and the role of them in this project.

At the end, he complimented JICA Study Team for their heartily and cooperation with Iranian Side.

Dr. Hojjat:

He thanked all attendants and JICA Study Team and explained about the situation and condition of Tehran and GTA in Iran. Tehran Province is:

- 1.2% of total area in Iran
- 20% of total population in Iran
- 35% of total industry in Iran
- 85% of total specialist in Iran
- 60-70% of total cash flow in Iran

He mentioned:

- The Transportation problem and the role of vehicles and car manufacturers and compared them with the past and the other countries.
- The effective and positive role of Executive Committee among different organization
- The positive activities that have done in recent years such as:
  *Using action plan from some years ago
  *Removing lead from gasoline with the cooperation of Ministry of Oil
  *Reducing sulfur amount in diesel fuel in buses
  *Introducing pollution standards concept to vehicle industries
  *100% of vehicles have catalyst converter
  *Except Pride all other productions are equipped with injector
  *Technical inspection centers, etc.
  He, also, explained about major activities that should be done in near future.

Dr. Shefie-Pour:

It was mentioned in his speech that the existing defect was a lack of efficient Management Model. Each environmental plan has a framework: 1) technical approaches 2) financial source 3) law structure to use technical approaches 4) participating people (the most important part) and connecting part of these four is the Dynamic Management Model. But, at this time, the support from economics and sociologists are also, required. Threfore, we should look for soft ware approaches not hard ware.

Q&A:

PP-1 (Dr. Pour Farhadi)

Q: Why does it take so long to prepare Inventory Data Base?
A: It is related to different idea (e. g. the cost, the easy estimation, the necessity, etc.)
Q: Why do you say that the study that carried out in 1994 doesn't have any environmental

value while the air pollution action plan is based on that study?

A: The study at that time was based on primitive information (e.g. the name of industries and the no. of employees) and just by estimation.

PP-3 (Mr. Hakimian)

Q: Would you please define "White Paper" in a sentence?

A: It is a report that presents to the Parliament or Board of Ministers. According to Japanese Expert, it is also reported to the people.

Q: Can White Paper assist to approve and to execute the approvals?

A: White Paper is a list of required information distributed to create the required sensitivity among the people. So, it will help to create guaranty.

Q: What is the content of White Paper?

A: It will be rather quantitative than qualitative.

Q: The speech of Mr. Matsuba and Dr. Shefie-Pour has different aspects and it is different from the agreement.

PP-7 (Mr. Mohammadi)

Q: Your solution is for pedestrians. My suggestion is to do something for motorcycles.

A: Motorcycle problem was discussed in the Traffic Organization. Since, this is a Pilot Project that we will not work on it. We shouldn't choose big area.

Q: What is the effect of this Pilot Project on reducing air pollution?

A: Where we have more traffic jam, we have more air pollution problem. So, we work on 3 points and investigate the traffic management plan and the amount of pollution emission. Therefore, if we do it for example at 100 points, we can measure how much pollution decrease and how we can design a Management System.

Q: Why you don't choose the most polluted part?

A: We should choose the part that has traffic jam. The objective of this Pilot Project is to explain the effect of such management plan to reduce air pollution.

Q: How much is the budget for this Pilot Project?

A: The budget is 55,000$ in total. The amount of 35,000$ is for the equipments and the remaining amount is for the study and others.

Q: Park meter and Intelligent Lights were not successful in the past. How about the Pay and Display device?

A: Each project or plan needs enforcement to be successful.

Q: Why don't you increase the parking?

A: It will encourage the people to use more vehicles and one of the traffic management opinions is not to establish the parking in crowded places.

PP-5 (Mrs. Jamali)

Q: Are there enough Technical Inspection Centers if the people want to come to the Inspection centers through your mass media campaign?

A: Mr. Pezeshkpour will explain about it in his speech.

PP-6 (Mr. Pezeshkpour)

Q: After Technical Inspection, how long does a vehicle remain in a good condition?

A: It depends on the technology of the vehicle. This relates to the manufacturers but the Inspection Centers.

PP-4 (Mr. Izanloo)

Q: How about the standards?

A: We know the latest environmental standards for producing vehicles.

Q: AQCC, also, remodeled some carburetors before and has some results.
A: AQCC didn't design the manifold but IPCO has done.
A: Mr. Zali mentioned that the JICA pilot project is as same as ours. If it carried out, it would only prove that what Iranian did before was correct.

Mr. Motomura & Mr. Hakimian

Q: While we have a lot of problems with most of the organization in obtaining their information. Because they say those are confidential. Then, how do you want to prepare and distribute White Paper?
A: It is the problem of developing countries but, we should try to use this international way and solve our problem. Using inter-net and creating websites are big advantages that are implemented by Management & Planning Organization.

MINUTES OF MEETING
BETWEEN
THE TEHRAN PROVINCE DIRECTORATE
OF
DEPARTMENT OF THE ENVIRONMENT
THE ISLAMIC REPUBLIC OF IRAN
AND
THE JICA STUDY TEAM
FOR
THE FOURTH SEMINAR
OF
THE STUDY
ON
STRENGTHENING AND IMPROVING AIR QUALITY MANAGEMENT
IN THE GREATER TEHRAN AREA
IN THE ISLAMIC REPUBLIC OF IRAN

14 February 2004

Mr. M. H. PIRASTEH
Director General,
Tehran Province Directorate,
Islamic Republic of Iran
Department of the Environment

Mr. Yuichiro MOTOMURA
Team Leader,
JICA Study Team for the Study on
Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran

Mr. Kiyotaka MATSUBA
Chairman,
JICA Advisory Committee, as Witness

The meeting between the Tehran Province Directorate of the Department of the Environment, Islamic Republic of Iran (hereinafter referred to as the DOE-Tehran), and the JICA Study Team (hereinafter referred to as the Team) for the Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran (hereinafter referred to the Study) was held on 14 February 2004 according to the following agenda:

1 Opening of the meeting
2 Discussion on the Fourth Seminar
3 Discussion on the direction of the cooperation in the third year
4 Discussion on the Interim Report Submission
5 Closing of the meeting

The meeting was presided by Mr. M.H.Pirasteh, the Director General of DOE-Tehran. The list of attendants is attached to this document.

1. Both sides acknowledged the success of the fourth seminar. The list of attendants is attached to this document as well as the agenda of the seminar.

2. Both sides agreed that issues raised in the seminar requiring further actions should be given due attention and effort to produce solution. Comments expressed in the seminar is attached to this document.

3. Both sides agreed that priority of activities of the Study in the third year should be as listed in the attached table and that the kind and degree of actual involvement of the Team for each activity would later be determined in consideration of resource constraints in the side of JICA. Both sides agreed that for selected activities both sides would provide adequate resources, human and otherwise, to the extent possible in order to ensure the successful execution of those activities.

4. Both sides agreed that the draft Interim Report would be submitted to DOE-Tehran as soon as possible and that comments on the Report by Iranian side if any would be conveyed to the Japanese side within two weeks of its submission so that the Interim Report would be submitted to the Iranian side by the end of March 2004.

ATTACHMENT 1 LIST OF MEETING ATTENDANTS

Iranian Side

Mr. M. H. PIRASTEH	Director General, DOE-Teheran
Mr. A. H. HAKIMIAN	Senior Expert, DOE-Teheran
Mr. Atsushi SHIRAI	JICA Air Quality Management Expert

Japanese Side

JICA Advisory Committee

Mr. Kiyotaka MATSUBA	Chairman

JICA Headquarters

Mr. Atsushi Ashida	Officer

JICA Study Team

Mr. Yuichiro MOTOMURA	Team Leader
Mr. Minoru HONDA	Stationary Source Emission Control
Mr. Yoshiyasu HIRAYAMA	Law and Institution

ATTACHMENT 2 SEMINAR AGENDA

OPENING SESSION

09:15-09:35	Opening Address	Mr. Pirasteh, TPD
09:35-09:55	Opening Address	Dr. Hojiat, DOE
09:55-10:10	Opening Address	Mr. Ito, EOJ
10:10-10:25	Opening Address: Environmental Achivement of SAIPA Groupe	Dr. Eftekhari, SAIPA
10:25-11:00	*Coffee Break*	
11:00-11:35	Air Pollution Mechanism in Teheran City Area	Mr. Shirai, JICA Expert

SESSION I: Introduction of Proposed MAP Chairman: Mr. Hakimian

11:35-11:55	Proposed MAP	Mr. Motomura, JICA Team
11:55-12:25	Omitting Concentrated Emissions from Diesel Engine in Urban Bus Terminals	Dr. Savadkoohi, Iran Automotive Industries Consulting Agency

SESSION II: Report of Pilot Projects Chairman: Mr. Hakimian

12:25-12:50	Inventory Survey (PP1)	Dr. Rashidi, AQCC
12:50-13:15	Introduction of Remodeled Carburetors (PP4)	Dr. Rashidi, AQCC Ms.Ghazarian, IOA
13:15-14:15	*Lunch*	
14:15-14:30	Public Awareness Campaign (PP5)	Ms. Motlagh, PARS ASHIAN
14:30-14:50	Pilot Training of Inspection Centers (PP6)	Mr. Panahi/Mr.Seif, SAIPA YADAK
14:50-15:05	Introduction of Traffic Control System (PP7)	Mr. Masoud, JICA Counterpart
15:05-15:20	Preparation of White Paper (PP3)	Dr. Fardowsi, ZIST SEPEHR
15:20-15:30	Introduction of MIS (PP2)	Dr. Jafari, Teheran Univ.
15:30-15:40	Closing Speech	Mr. Pirasteh, TPD

SUMMARY OF ADDESSES, PRESENTATION and COMMENTS

OPENING SESSION

Mr. Pirasteh:

Firstly, he expressed his thanks to all attendants in the 4th seminar especially to the SAYPA for their cooperation in organizing the seminar. Then, he explained about the background of the JICAs' 3-year Project. The Project was initially formed by the close cooperation by Dr. Shafie-Pour and others and JICA. The Project started in September 2002 and has undertaken activities till now including 7 Pilot Project Implementation, which Executive Committee approved in February 2003. For each of Pilot Projects a Pilot Project Management Unit (PPMU) was formed to ensure the smooth implementation. There are also 4 Working Groups, which deal with the major issues of air pollution to be solved.

At the end, he acknowledged JICA Study Team for their heartily cooperation with Iranian side.

Dr. Hojjat:

He thanked all attendants, JICA Study Team, SAYPA, and DOE for organizing the seminar. He emphasized the importance of management issues and it needs to be addressed despite its difficulties. He mentioned following items to be addressed in order to improve air quality management.

- Priorities need to be set since there is a limitation in human power, time, and budget.
- Execution feasibility needs to be examined in investigating the cultural and social aspects.
- Coordination between the different organizations is essential to achieve the goal.
- Paying attentions to the policy maker's characters.
- Paying attentions to the public characters.
- Recognize the tendency that public consider themselves as special (which is false).

He also touched upon the progress of the TenYear Action Plan with indicating following achievements.1

- Establishment of technical inspection centers (100%)
- Operation of the CNG buses (100%)
- Parking meter installation (100%)
- Intelligent traffic lights installation (100%)
- Replacing old Paykan vehicles and remodeling the carburetor (20%)
- Fuel improvement by removing lead (100%)
- Distribution of diesel oil with low sulfur contents (100%)
- Presenting a Plan to produce low sulfur diesel oil by MOI (100%)
- Using ECER83 standards for vehicles (100%)
- Public Education (100%)

In the end, he again thanked the all attendants of the seminar.

Mr. Ito:

He first thanked for the invitation. He acknowledged the serious air pollution problems in Teheran and emphasized that there is a great need for finding solutions. He briefly introduced the JICA Study Project as mentioning the steps taken. This includes the first phase of study for data and information collection to understand the current conditions, then, the implementation of Pilot Projects and formulation of Management Action Plan for the 2nd year. The coming 3rd year will see the execution of Management Action Plan. Important point is how much of technology transfer is to be made within the coming one year so that an organizational structure would be established in Iran to proceed the task of improving air quality by Iranian officials

alone after the Study is completed. The possibility of reaping the fruit of past effort depends on the cooperation and execution by concerned people including those in the government of Iran, the JICA study team, and others.
He thanked all the efforts through the JICA Study and cooperative work done by both Iranian and Japanese sides.

Mr. Shirai: **Presentation on the Air Pollution Mechanism in Teheran City Area**
His presentation concerned with the current air pollution mechanism in Teheran. He mentioned about the air pollution mechanism on CO and O_3 pollution in Teheran City Area. He emphasized that in order to obtain significant statistics, quality of data should be kept high. Thus, feom the transaction files, extraordinary values are screened out.
He introduced the newly developed Data Management System, which is under operation in DOE-Teheran. The system consists of two programs named "Monitoring Data Quality Management Program" and "Air Quality Monitoring Data Display Program". The system is quite universal and applicable to any Provinces in Iran and easy to operate.

SESSION I: Introduction of Proposed MAP
Mr. Motomura and Mr. Hakimian
They together introduced the background of proposed Management Action Plan formation indicating the steps taken by the JICA Study Team through the previous study periods. It includes assessment of current situation, implementation of Pilot Projects, identification of weaknesses, principles of MAP, and MAP formation. The examples of individual MAP measures were introduced in the form of tables, which linked with management and existing measures for pollutant reduction. Moreover, candidate MAP projects under the 3rd year JICA Project were also proposed.

Dr. Savadkoohi: Presentation of Omitting Concentrated Emissions from Diesel Engine in South Urban Bus Terminal
He presented a project to omit concentrated emissions from diesel engine in south urban bus terminal. It aimed to establish special bus depots, which can be directly connected to exhaust pipe of vehicles to absorb pollutant gas. He mentioned that the DOE is currently supportive of the concept of the project. The Human Environment Deputy will study the project and take necessary steps for the implementation. The SAYPA Group will carry out the project in one of the bus terminal.

SESSION II: Report of Pilot Projects
PP-1 (Dr. Rashid)
The objectives of PP1 are to conduct both mobile and stationary emission inventory survey in GTA. The major scope of the work includes:
- Preparing the list of emission in 2002;
- Estimating the rate of pollutant emission in 2002;
- Estimating the list of emission in 2003 and in 2009; and
- Estimating the rate of pollutant emission in 2003 and in 2009.

The AQCC (subcontractor) reported the progress of data collection from the related ministries, organizations, and companies. They will estimate the both mobile and stationary sources share by various air pollutants in GTA in 2002, 2003 and 2009 and the emission rate of the air pollutants from mobile sources.

Q: How do you consider the airplane pollutants as mobile or stationary?
A: Airplane activities are considered limited to the airport and therefore it is a stationary source.

PP-4 (Dr. Rashid and Ms Gahzarian)

The objectives of PP 4 are changing old Peykan carburetor with fixed venture model and examining strategy to promote upgrading among Paykan users. The major scope of the work included:

- Replacement of 50 Paykans carburetor; and
- Examination of strategy to promote Paykan owners for carburetor replacement based on the Questionnaire survey.

The replacement of 50 Paykans is the under progress and the survey among Paykan drivers collected 500 samples and analysis is under process.

PP-5 (Ms. Motlagh)

The objectives of PP 5 are to implement the public awareness campaign through mass media to encourage the old vehicle owners in GTA vehicle inspection and vehicle maintenance to contribute to the air quality improvement in upgrading the conditions of vehicles and to establish a prototype of public awareness campaign method in utilizing mass media in evaluating the impact of campaign and creating a manual. The major scope of the work includes:

- Campaign implementation through TV, Radio, and Newspaper;
- Conducting impact survey after the campaign; and
- Preparation of an implementation manual.

The campaign was carried out between November and December 2003 in all media and it was followed by the impact survey. The survey collected approximately 1,600 samples and it is under analysis. The films of campaign can be viewed at the JICA-DOE Project website (*http://tehranair.irandoe.org/*).

PP-6 (Mr. Panahi and Mr. Seif)

The objectives of PP 6 are to gain the awareness of environmental considerations and engines and to improve the technical skills of both repair shops and inspection centers personnel. The major scope of the work includes:

- Implementation of training course for repair shop engineers; and
- Implementation of training course for inspection center engineers.

Above training was participated by the 15 from repair shops and 15 from inspection centers both for 4 days duration. The course contents included Engine thermodynamics and Combustion, Engine Management, and Environmental Considerations and Engines. It was reported that environmental awareness was especially gained through the training and willingness to continue similar activities was apparent.

PP-7 (Mr. Mohammadi)

The objectives of PP 7 are to assess and estimate the effectiveness of traffic management in decreasing traffic congestion and emission of pollutants by implementing traffic management schemes. The major scope of the work includes:

- Nomination and site selection for implementation of traffic management schemes;
- Implementation of schemes; and
- Assessment of Project.

It was reported that the nomination and site selection were completed and implementation of the schemes was under process. The selected sites for proposed schemes are; Kaji Square, Milad Noor Building neighborhood, and Fatemi Street.

PP-3 (Dr. Fardowsi)

The objectives of PP 3 is to prepare an integrated report on the status of air pollution and its control in the GTA to be presented to administrative, training and research institutions as well as the general public. The major scope of the work is to collect necessary information from related organizations and consolidate the information into a "White Paper" under the following contents:

- Introduction
- Legislation framework
- Decision-making and coordination
- Public awareness and participation
- Air quality in Tehran
- Major stationary sources of pollution
- Mobile sources of air pollution
- Control measures
- Contingency plan

It was reported that 70% of the work was completed and some recommendations were mentioned. These included that the White Paper to become institutionalized within DoE, to be extended to other areas and domains, to be updated annually, to be published and widely disseminated, and to be a bilingual document.

PP-2 (Dr. Jafari)

The objectives of PP 2 is to develop a Website incorporating Management Information System (MIS) in order to assist planning, monitoring, and decision making of the Executive Committee (EC). The following functions are planed to be achieved by introducing Web-based MIS for the EC.

- Development of portal site for the EC;
- Function to manage progress of other Pilot Projects;
- Function of smooth information transmission; and
- Informational sharing in the EC.

It was reported that the first phase of the project was completed with following items 1) an analysis of current situation (system and communication environment), 2) requirement analysis and negotiation with members of pilot Project Management Unit 2 (PPMU2), and negotiation and fixation of systematized area. The second phase is under progress with following items 1) data base design & function design, operation design, detailed design, programming and test, user confirmation test, setting up the real data to the data base and installing the software. Dr, Jafari stressed that it is essential to obtain cooperation from related organizations to run the MIS system.

CLOSING SPEECH

Mr. Pirasteh

He thanked kind participation to the seminar. He then emphasized that if we keep good and close cooperation from different organizations, we would achieve targets faster and better. He also mentioned that in order to provide effective measures to reduce air pollution, we should utilize the experiences of developed and successful countries such as Japan and JICA Study Team. In the end, he showed his appreciation toward the SAYPA Group for their cooperation.

MINUTES OF MEETING
BETWEEN
THE TEHRAN PROVINCE DIRECTORATE
OF
DEPARTMENT OF THE ENVIRONMENT
THE ISLAMIC REPUBLIC OF IRAN
AND
THE JICA STUDY TEAM
FOR
THE FIFTH SEMINAR
OF
THE STUDY
ON
STRENGTHENING AND IMPROVING AIR QUALITY MANAGEMENT
IN THE GREATER TEHRAN AREA
IN THE ISLAMIC REPUBLIC OF IRAN

5 December 2004

Dr. M. H. PIRASTEH
Director General,
Tehran Province Directorate,
Islamic Republic of Iran
Department of the Environment

Mr. Yuichiro MOTOMURA
Team Leader,
JICA Study Team for the Study on
Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran

Mr. Kiyotaka MATSUBA
Chairperson,
JICA Advisory Committee, as Witness

The meetings between the Tehran Province Directorate of the Department of the Environment, Islamic Republic of Iran (hereinafter referred to as the DOE-Tehran), and the JICA Study Team (hereinafter referred to as the Team) for the Study on Strengthening and Improving Air Quality Management in the Greater Tehran Area in the Islamic Republic of Iran (hereinafter referred to the Study) before and after the fifth seminar were held on 30 November and 5 December 2004.

The meetings were presided by Dr. M.H. Pirasteh, the Director General of DOE-Tehran. The list of attendants is attached to this document.

1. Both sides reviewed the process of carrying out the Study throughout the entire study period starting from September 2002, and acknowledged that the exercise was beneficial to the Iranian side in that technology transfer had been made through the cooperative working among members of the Team, Iranian counterparts, and various Iranian officials and other concerned people in Iran.

2. Both parties also agreed that tangible and intangible outcomes in improving the management of air pollution control in the Greater Tehran Area had been realized in the form of the Management Action Plan including the strengthening of Executive Committee secretariat, the establishment of emission sources inventory system, and the publication of White Paper.

3. Both sides acknowledged the success of the fifth seminar, in which tangible as well as intangible study outcomes had been reported and explained such as the strengthening of Executive Committee secretariat, the establishment of emission sources inventory, and the publication of White Paper. The summary of presentations and discussions is attached to this document as well as the agenda of the seminar.

4. Both sides agreed that actions would be taken by the Iranian side to follow up the outcome of the Study so that the momentum produced by the Study would be kept and objectives of the study outcome would be continuously pursued.

5. Both sides agreed that comments by the Iranian side on the Draft Final Report would be conveyed to the Japanese side by the end of December within 2004.

6. DOE-Tehran agreed that the results of the Study would be made open to the public to ensure their maximum usage.

7. DOE-Tehran requested JICA for a continuous support in this field.

Attachment 1 List of Meeting Attendants

Iranian Side

Dr. M. H. PIRASTEH	Director General, DOE-Teheran
Mr. A. H. HAKIMIAN	Senior Expert, DOE-Teheran
Dr. Karim POURFARHADI	Head of Laboratory, DOE-Tehran
Mr. S. A. F. VAHDATI	Expert, DOE-Tehran
Mr. Ali SHOGHI	Collaborator of the Study

Japanese Side

JICA Advisory Committee

Mr. Kiyotaka MATSUBA	Chairperson

JICA Headquarters

Ms. Izumi TSUCHIHATA	Officer

JICA Study Team

Mr. Yuichiro MOTOMURA	Team Leader
Mr. Yasuhiko MURAMATSU	Stationary Emission Sources Management
Mr. Hiroyuki KANZAKI	Human Resources Development and Institution
Mr. Satoshi OGITA	Plan for Mobile Emission Sources Reduction
Ms. Madoka YAMARYO	Coordinator

Attachment 2 Seminar Agenda

8:30-9:00	Registration
OPENING	
9:00-9:45	Prayer Opening Address (Dr. Pirasteh, TPD) Opening Address (Mr. Mojabi, DOE) Opening Address (Mr. Matsuba, Chairperson of the JICA Advisory Committee)
9:45-10:15	*Tea Break*
SESSION I: Formulation of Management Action Plan (MAP)	**(Chairperson: Mr. Hakimian)**
10:15-10:30	Objectives, Framework and Process of MAP Formulation (Mr. Hakimian, National Project Director, TPD)
10:30-11:00	Comparative Institutional Analysis (Mr. Motomura, Team Leader, JICA-DOE Study Team)
11:00-11:15	Q&A
SESSION II: Management Improvements Through Implementation of MAP	**(Chairperson: Mr. Hakimian)**
11:15-11:45	Strengthening of EC Secretariat (Mr. Vahdati, EC Secretariat, TPD)
11:45-12:25	Inventory of Emission Sources (Dr. Pourfarhadi, TPD/ Ms. Nadimi, Ms. Keivani, National Counterparts)
12:25-12:40	Preparation of White Paper (Mr. Hakimian, National Project Director, TPD)
12:40-13:00	Q&A
13:00-13:10	Closing Speech (Dr. Pirasteh, TPD)

Attachment 3 Summary of Addresses, Presentations and Comments

OPENING SESSION

Dr. Pirasteh:

He expressed his thanks and gratitude to members of the JICA Advisory Committee and JICA Study Team for their close cooperation with Tehran Environmental Directorate in carrying out our joint project. He wished to express his deep thanks to Mr. Matsuba, the head of the JICA Advisory Committee, and Mr. Motomura, the team leader of the Study and other Japanese experts for their extensive endeavors of progress of the project. Also He thanked Mr. Wakui, the representative of JICA in Iran for his close cooperation with the project. He mentioned that after 3 years of the Study, the final results, findings and recommendations of the project would be presented and discussed in this seminar. He pointed out they faced some unforeseen problems and obstacles in smooth implementation of the study especially pilot projects causing some delay in some projects regarding our time table. But the JICA Study Team along with Iranian counterparts and collaborators tried best to overcome these obstacles to minimize these delays.
Now, it is my pleasure to inform you that the Management Action Plan (MAP) has been formulated and we expected to have the views of distinguished guests in this regards making it as effective as possible. Since this Management Action Plan will be a qualitative blueprint for our further actions in combating air pollution in Tehran, the views and experiences of Iranian experts are extremely important to be included in the MAP for more efficiency of the work.
In conclusion I again convey my thanks for your participation in this seminar and furnish us your points and views. Thank you.

Mr. Mojabi:

He welcomed all guests and hosts. The first Iran development plan mentioned just the brief comment about environmental issues. This comment was improved in second plan and the third plan included an exclusive chapter for environmental is issues. The main theme of the forth plan will be a sustainable development and environment issues will take an important roll in it. It is important to tackle air pollution especially in the seven polluted cities. International cooperation organization such as JICA and the World Bank provided proper strategy for improvements. JICA's project achieved management improvement and developed management guideline for reducing air pollution with the joint team between DOE-TPD and JICA. We can also see achievements in the Ten Year Action Plan. One of the important achievements was human resources development for experts who are working for management improvement of DOE-TPD and other related organizations. This project started in 2002 and introduced some projects such as databank for inventory, MIS system, substitution of carburetors, public awareness, human resources development in TVTIB and other authorized centers, and physical improvement for traffic management at three sites. One of the most important achievements is the EC secretariat. Thanks to all who took part in this project, especially the Japanese team, JICA members, and the responsible organizations. Also, I would like to give special thanks to Dr.Hojjat, Dr.Prasteh, Dr. Shafie-Pour, Mr.Hakimian and other counterparts. We will utilize the achievements on improving Tehran air quality

Mr. Matsuba:

He first thanked for the invitation. He appreciated efforts of the Iranian side to hold the seminar. He also thanked all the efforts through the JICA Study and cooperative work done by both Iranian and Japanese sides. He emphasized that Japanese and Iranian sides made a great effort to find solutions. This Japanese cooperation, under a strong leadership by Dr. Hojat, was first formulated by Dr. Shafie Pour and then developed by Dr. Pirasteh, cooperated by the concerned

people such as the EC members. Tangible and intangible outcomes were achieved such as i) capacity building of the EC Secretariat, ii) inventory for mobile and stationary emission sources, and iii) the White Paper. These management improvements would be essential components to reduce air pollution. He also explained about his impression that this Study established a new cooperative relationship between Iranian and Japanese sides. Based on a strong relationship, Japanese and Iranian sides produced outcomes mentioned above. The Study was led by ownerships of the Iran side, while Japanese side learned Iranian culture and way of thinking. Finally he explained about his expectations. Many organizations were involved in air pollution issues generated from mobile sources. Thanks to this Japanese cooperation, these organizations would realize their roles and responsibilities and take further efforts to reduce air pollution further. As a result, management would be improved.

SESSION I: Formulation of Management Action Plan (MAP)

***Mr. Hakimian*: Objectives, Framework and Process of MAP Formulation**

He introduced how MAP was formulated after a brief introduction of the Study background, objectives and schedules. First, the current situation, including the efforts and management of various air quality control activities and progress of the Ten-Year Action Plan were evaluated. A number of problems and areas of possible improvement was identified, after which, the seven pilot projects were identified in order to further understand the problems and find effective ways to rectify them. Through the implementation of these pilot projects, weaknesses in the management system were identified and principles for formulating the Management Action Plans were created. Finally, he explained that 15 priority MAP components were established and out of them, three MAP components, which would be introduced in Session II of the seminar, received direct supports or active consultation by the JICA Study Team for the implementation. At his presentation, he emphasized the importance of capacity building, which was achieved through the Study.

***Mr.Motomura:* Comparative Institutional Analysis**

He introduced the results of comparative institutional analysis of Tehran's air quality control with the State of California and Tokyo. 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. Experiences of the State of California and Tokyo Metropolitan Government showed possible improvements in Tehran, including: decentralizing environmental authority; clarity of responsibility; improvements in coordination; information accuracy; and increase in public participation.

SESSION II: Management Improvements Through Implementation of MAP

***Mr. Vahdati*: Strengthening of EC Secretariat**

After the brief explanation of legal stratus of the EC Secretariat, he explained about capacity building for the Executive Committee through expansion of its Secretariat and introduction of a Management Information System (MIS). He first introduced changes in an organizational structure, and then installed new functions: feedback function of EC discussions and action plans monitoring functions. He also showed tangible outputs such as a progress report of the Ten Year Action Plan and newsletters. Finally he pointed out future directions: i) Locate the EC secretariat to the organization chart of DOE-TPD; ii) Set a managerial procedure for action plans monitoring by a guideline approved by EC and workshops; iii) Upgrade feedback functions to follow up discussions at EC; and iv) Expand functions such as Air Quality Monitoring and Research Units.

Dr. Pourfarhadi: Inventory system

He presented issues about inventory and mentioned the computerized, intelligent, and dynamic system of stationary and mobile inventory, which was introduced jointly by the Japanese and Iranian sides to predict and show air pollution and its sources. He also mentioned they need a contentious support by DOE and MPO to develop an organizational structure and to allocate budget for the inventory system in Tehran. He thanked to Ms. Nadimi for the stationary inventory and Ms. Keivani for cooperation in the mobile inventory.

***Ms. Nadimi*: Inventory for stationary emission sources**

She first presented two issues of the inventory for stationary emission sources. Limited information on facility and paper-based management prevented DOE-TPD from effectively and efficiently managing stationary emission sources. Then she presented measures to be taken to solve the problems. The new application format will enable DOE-TPD to judge environmental compliance of proposed facilities in preconstruction period. A computer database will enable DOE-TPD a quick access to information and enable targeted intervention on stationary emission sources. Finally, she pointed out future directions: i) data encoding of the remaining data and extended coverage of the data; ii) strengthen the inventory task team by incorporating the team into DOE-TPD's organizational structure to make the practice sustainable; iii) ensure high staff stability for inventory development with clear definition of tasks and responsibilities; and iv) extend fiscal support to data collection and encoding by DOE-TPD to enable wider data coverage.

***Ms. Keivani*: Inventory for mobile emission sources**

She first presented issues that inventory for mobile emission sources was not been updated and roles of DOE-TPD were not clearly defined and capabilities of the staff were weak. Then she presented measures to be taken to solve the problems. The established inventory update system will enable the DOE-TPD laboratory to update inventory information more efficiently. She explained that necessary skills were enhanced through the preparation of Guidebooks for Inventory Preparation and Update and the technical workshops based on defined roles and necessary skills of DOE-TPD laboratory staff for mobile sources inventory. Finally, she introduced executing formation for emission source management as future directions. In her presentation, she introduced how to update inventory for mobile emission sources and some case studies to show usefulness of the inventory.

***Mr. Hakimian*: Preparation of White Paper**

He explained about purposes and contents of the White Paper. He mentioned the 15 MAP measures, 3 for DOE, first one is inventory, second management system for EC, and third one White Paper, which includes latest status of air pollution in Tehran City in 2003. The final draft will be published soon. English version is ready. The report will be useful scientifically. Farsi report also includes some historical information and comparative studies including exhaust from chimney and vehicles. All organizations related to this procedure like DOE, MPO and others parts and also management issues were studied.

Q&A
Q: Why did you compare Tokyo and California? Are there any similarities in traffic and geographical conditions?
A: Tokyo and California were studied for management issues and for being a successful pattern.

Q: Is there any scientific background to 4 (Proper Standards) and 7 (yearly drop of 100000 used vehicles from 2005) percent reduction of air pollution in Tehran City?

A: It is based on the 1996 report from TERP and another estimated calculation. If we consider all aspects, it would need much more money.

Q: When will we see air pollution reduction based on the programs presented?
A: It depends on implementation and other organizations' cooperation. Also there are too many other factors that should be considered.

CLOSING SPEECH

Dr. Pirasteh:

He thanked kind participation to the seminar. He then emphasized that if we keep good and close cooperation from different organizations, we would achieve targets faster and better. He also mentioned that in order to provide effective measures to reduce air pollution, we should utilize and make more cooperation between all people and organizations involved, and we do have some limitations especially in used vehicles, as there is much resistance to replace them. I thank all the members of JICA-DOE TPD Study team and all other experts involved. We are ready to hear others comments and suggestions regarding air pollution and its reduction. Also we prepared EC and EC secretariat to have more cooperation and conquer this situation. All experts are asked to submit their recommendation also about Ten-Year Action Plan and MAP.

Appendix C Comparative Analysis on Institutional Arrangements for Air Quality Management

C1 Introduction

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 (TMG) (Japan). Case of other cities in the world including Aichi-prefecture in Japan and several cities in Europe were studies before choosing California and Tokyo for in-depth study. California and Tokyo were chosen, as they seem to exemplify two opposite reaches in operational tenets of society in many respects as explained below.

A government is a reflection of the social norms of the country; therefore, by looking at two historically and culturally different countries, such as the US and Japan, a better comparison can be made.[1] The government of the United States was formed with the following components: popular sovereignty, representative government, checks and balances, and federalism.[2] The US society is based on individual rights and personal responsibility, which is why there is a lack of group orientation and little social safety net, such as national healthcare and an adequate pension. This historical basis has led to significant power sharing among multiple levels of government and individuals where certain issues are the responsibility of the federal government, but many items are left to the responsibility of the states or even local government, such as education and further taxation. Other issues, such as environmental protection are shared among the levels of government. Because the US exemplifies many aspects of the furthest reaches of the western mindset, it was chosen as one country for a comparative analysis.

Japan, on the other hand, epitomizes the eastern outlook to society and government. It is thought to be the most group-oriented of the industrialized countries, where people do not exist as individuals as much as they associate with a group or groups. Here there is a pervasive group approach that underscores all facets of Japanese culture and society, including government functions. Because a group consensus is an objective, the minority still has a voice, which leads to a much more complementary decision-making environment, both for individual citizens and authority figures. This leads to an environment where government responsibility is expected, which can be seen in the social safety net of the Japanese pension system and national healthcare. However, because of the expectations that the government will provide, there is much less individual responsibility and civic involvement. Although examples of individuality can be found in Japan, as well as group consensus in the United States, these two examples exemplify the range of government organizations, which can be extrapolated to include an assessment of how to handle environmental policy.

Control of air pollution by local governments is highly dependent on each region's natural and social conditions and therefore, a one-size fits all approach would be imprudent. However, each region need not start from scratch, as there are some institutional mechanisms to combat air pollution that can be applicable across many regions. This analysis aims to (i) identify mechanisms of air pollution control by local governments by comparing two regions and (ii) apply these mechanisms to improve air pollution control in Tehran province.

[1] California and Tokyo Metropolitan Government were chosen from the US and Japan because they are the largest areas economically and population-wise within each country. Therefore, the conclusions drawn about the US and Japan can be extrapolated to include California and TMG.

[2] Originally only landowners were granted the right to vote. Women, African Americans, and other minorities were added in the 20th Century.

C2 Comparative Analysis on Institutional Arrangements for Air Quality in California and Tokyo

(1) Introduction

The State of California (United States) and the Tokyo Metropolitan Government (TMG) (Japan) were compared and contrasted for this analysis. In parallel with Tehran Province, California and Tokyo both have large populations, their economic production is the highest in their respective countries, and they both have major issues with air pollution, mainly from vehicle exhaust. In addition, their efforts to lessen air pollution from automobiles are advanced. Therefore, they present good case studies for finding examples of mechanisms to control air pollution in urban areas.

Items to be compared are (i) historical background; (ii) social and geographical conditions and current air quality; and (iii) methods of air pollution control including roles and responsibilities of regional/state and local governments, organizational design, decision-making processes, air quality monitoring and data collection from industries and businesses, and public participation. Mechanisms for air pollution control by local governments are derived by comparing and contrasting California and Tokyo.

(2) Background of California and Tokyo

In this section, the historical background of the US and Japan and the geographic and social conditions of California and Tokyo Metropolitan Area (TMA) are introduced.

Historical, Social, and Geographical Background

United States and California: The government of the United States was formed with the following components: popular sovereignty, representative government, checks and balances, and federalism.[3] Since there was no ingrained feudal system to use as a baseline and the revolution was fought in part to reject the social hierarchy and hereditary monarchy of Britain, the traditional mechanisms of social order, such as a group focus and basic welfare for all, were lacking in the fundamental structure of the new government. The sharing of powers among multiple levels of government and individuals (federalism), as well as the elections by individual citizens has brought about a balanced nature to government where certain items are the responsibility of the federal government (right to declare war being the most obvious), but many items are left to the responsibility of the states or even local government, such as education. Additionally, many responsibilities are shared between the federal and state level where the national level sets certain standards that must be implemented, but the individual states are able to raise the bar and implement them as they see fit. This is typically seen in environmental regulations and control.

As America has grown, so too has the strength of states, individuals, and the private sector because of the limited safety net provided by the government; capitalism, which has created a focus on winning and new ideas; and a lack of traditions. The litigious nature of the United States is based primarily on the importance provided to the judiciary system, as well as the innate conflicting and individualistic nature of its society.

California was the 31st state of the United States. Its population is approximately 35.5 million

[3] Originally only landowners were granted the right to vote. Women, African Americans, and other minorities were added in the 20th Century.

(2003 estimate) and it encompasses 424,000 square kilometers. It has 58 counties and includes several major US cities and metropolitan areas including (i) Los Angeles: 2nd largest metropolitan area in the US with 12.4 million people; (ii) San Francisco: 12th largest US metro area with 4.1 million people; and (iii) Riverside/Ontario: 13th largest US metro area with 3.3 million people; and (iv) San Diego: 17th largest US metro area with 2.8 million. Its gross state product was 1,359 billion US dollars in 2001, which accounts for 13% of the national total, the highest of the fifty states.[4] The state's major air quality issue is exhaust from mobile sources, specifically from automobiles - in 2000, the state had over 26 million cars registered.[5]

Japan and Tokyo: Japan has a central government that includes a separation of powers between administrative, legislative, and judiciary functions. The prefectural and local governments are not independent of the national government. Instead, the local governments, such as the TMG, exercise their power to the extent permitted under the Constitution or legislation created by the central government. Although Japan has been moderately decentralizing authority to local governments for a while, a major movement toward decentralization was not seen until very recently, when Upper and Lower Houses adopted resolutions to promote decentralization in 1993 and 1995.

There are some other national characteristics about Japan, which may provide some context as to why the Japanese system is created in this form. It is often said that Japanese are group oriented and place great emphasis on group consensus as opposed to individuality. However, before the Meiji Restoration, 135 years ago, the actual political system was of a feudal nature, in which most administrative powers were distributed among some 300 local Hans or fiefdoms. What took place after the Restoration was a continuous effort to centralize government authority. Consequently, organizational hierarchy and the need to maintain it have become very strong. Both of these factors contribute to the limited decentralization of the government and the strong use of certain aspects in the decision making process, such as councils and committees comprised of highly regarded academics.

The TMA includes 23 wards and 26 other municipalities and towns to cover an area of almost 2,200 square kilometers.[6] Its population is over 12 million people. Its gross prefectural product was 84,763 billion Yen in FY 2001, which accounts for 17% of the national total, the highest among 47 prefectures.[7] Tokyo's largest air pollution problem is from mobile sources, particularly automobiles. In 1998, TMA had 5.5 million vehicles registered.[8] In spite of an extensive and efficient public transport system, roadways in TMA are very congested with private automobiles, motorcycles, taxis, buses, and trucks.

Comparison: The US government's structure is comprised of a federal government and very independent state governments. In comparison, Japanese prefectures have less authority, although decentralization is taking hold. Overall, California and Tokyo are similar that they, as a percentage of countrywide statistics, have high population and economic activities as well as an extensive problem with automotive air pollution. The population, area, and economic activity of California; however, is far larger than Tokyo, which indicates that California's state government must oversee a wider area with more topographic differences and a greater number of pollution

[4] The figure is nominal and is preliminary (Source: U.S. Bureau of Economic Analysis).
[5] Bureau of Transportation Statistics, Department of Transportation. (http://www.bts.gov/publications/state_transportation_profiles/california/html/fast_facts.html)
[6] The 23 special-ward area comprises the center of the Tokyo Metropolis, where commercial and business facilities are heavily concentrated.
[7] The figure is nominal. (Source: Statistics Bureau, Ministry of Internal Affairs and Communications, *Shakai Seikatsu Tokei Shihyo* (in Japanese))
[8] Bureau of Construction, Tokyo Metropolitan Government, *Road and Service at Tokyo* (in Japanese), 2000.

sources.

Current Air Quality

The current air quality of California and TMA is briefly introduced.

California[9]: Among the various air pollutants, ozone, particulate matter (PM), and carbon monoxide (CO) pose the most significant air quality problems in California.[10] The contributions of on-road mobile sources to emissions of ozone precursors are quite large: 51% for NO_x emissions and 33% for reactive organic gases (ROG). Mobile sources contribute only slightly to directly emitted PM, but are a major source of secondary particles. PM emissions are also related to motor vehicle population levels, because some of the fugitive dust emissions come from paved and unpaved roads. As for CO, on-road mobile sources account for 61% of the total CO emissions. However, the control programs have substantially reduced its concentrations and most areas of California are meeting CO standards.

Tokyo[11]: Tokyo has been able to meet the environmental quality standards of sulfur dioxide (SO_2) and CO and their annual average concentrations are on the decline. On the other hand, TMA has failed to meet the standards of suspended particulate matter (SPM) and NO_x, especially at roadside air pollution monitoring stations. In Tokyo, 60-70% of SPM has a particle diameter equal to or less than 2.5μm (PM2.5), which is emitted from diesel-powered vehicles or formed secondarily in the atmosphere from hydrocarbons and other substances. The annual average concentration of photochemical oxidant has been exceeding the standards and shows no signs of abating.

Comparison: Because of the high use of automobiles in both California and Tokyo, emissions of air pollutants from mobile sources are quite high and the largest cause of air pollution. This forces both governments to place a large emphasis on mobile source emissions control. The renewed focus on mobile sources is also a result of the fact that until recently, many stationary sources were heavily targeted to improve air quality. These attempts were relatively successful and any further attempts to lessen their emissions will require a much heavier cost burden on industries and local governments.

(3) Methods of Air Pollution Control

Roles and Responsibility of the Governments

In this section, the institutional authorities responsible for air quality control in California and Tokyo are introduced.

California: As is typical of many government functions in the United States, air quality and the capacity and capabilities to improve it have been largely decentralized and are a function of state and local governments. Although the minimum levels of ambient air quality standards are set by the federal Environmental Protection Agency (EPA), individual states are able to establish more stringent standards if they chose to, but must at least meet those standards set at the federal level. The states are also provided with the autonomy to meet the standards through any relevant and applicable mechanisms such as technology, credits, penalties, etc.[12]

[9] California Air Resources Board, *The 2004 California Almanac of Emissions and Air Quality*

[10] The criteria air pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), and sulfur dioxide (SO_2).

[11] Environment Bureau, Tokyo Metropolitan Government, *Tokyoto Kankyo Hakusho 2004* (environmental white paper for FY 2004 in Japanese).

[12] California is also allowed to set its own vehicle emissions standards that car manufacturers must meet, but it is the only US state that is able to do that. All others must follow the EPA guidelines.

Because of the topographic and atmospheric variation among regions within a state, such as the differences between San Francisco and Los Angeles, and the movement of air pollution between cities and states, such as between New York and New Jersey, much of the decision-making for air quality improvements has been decentralized even further - to the regional level.

In the 1940s and 50s, California began implementing air quality improvements at the county level, but soon realized that it was an ineffective and moreover, inefficient approach to combat air pollution as pollution crossed city/county boundaries, technical equipment and personnel were expensive and in short supply, and it needlessly created competition between neighboring counties.[13] This prompted the creation of regional air basins by the California state government, based on scientific data and topography, as opposed to demographics or politics.[14,15]

In 1967, California mandated the creation of regional air quality management districts (AQMD) and air pollution control districts (APCD). These 35 local air districts were designed based on the regional air basins and often encompass multiple counties.[16] They are tasked with establishing and enforcing air pollution regulations of stationary sources in order to attain and maintain all state and federal air quality standards. They also implement transportation control measures to help limit mobile source emissions.

This leaves the true responsibility of mobile source emissions under the state government. One of the rationales for the split in responsibilities is that mobile sources require a higher level of government intervention as they impact individuals and are therefore, more political and more difficult to implement. For example, previously, the South Coast Air Quality Management District (SCAQMD), encompassing Los Angeles, Orange, San Bernardino, and Riverside counties, attempted to undertake various mobile source improvements by targeting the personal automobile through employer trip reduction rules. This was met with a highly negative reaction from the general public and due to political pressures, ended with a state law that prohibited the any AQMD and APCD from making similar regulations.[17]

Tokyo: In Japan, the role of prefectural governments in the field of pollution control has been quite large. The first action to control various types of pollution was initially made by prefectural governments. TMG first enacted an ordinance on air pollution in 1949, the Factory Pollution Prevention Ordinance. Osaka followed suit the next year with a similar ordinance. The central government only followed in the 1960s with the Smoke and Soot Control Law (1962), Basic Law for Pollution Control (1967), and Air Pollution Control Law (1968). From then on, it has been largely the policy to give greater power to the local governments in the realm of environmental quality.

Today, the central government sets ambient air quality standards and emission standards for stationary and mobile sources and allows prefectural governments to set more stringent standards. Although it is only for stationary sources that laws explicitly say that prefectural governments are allowed to set more stringent standards, there are several cases, including one in Tokyo, that created more stringent standards for diesel-powered automobiles. Prefectural governments are also responsible for formulating and implementing measures according to

[13] Neighboring counties could decide not to implement various air quality improvements thereby creating an enticing reason for businesses to move between neighboring areas.
[14] Areas where air pollution is generated and tends to remain.
[15] Wachs, Martin and Dill, Jennifer, *Regionalism in Transportation and Air Quality: History, Interpretation, and Insights for Regional Government*, University of California Transportation Center, September 1997.
[16] A county is the largest administrative division of most states in the United States.
[17] Wachs and Dill.

natural and social conditions of the region and for coordinating measures by governments of wards, cities, and towns. Wards, cities, and towns are responsible for formulating and implementing measures according to their regional conditions. They are also responsible for administrative works directed by TMG.

Comparison: Both the State of California and TMG are able to set more stringent standards than the standards set by the national governments and are responsible for the air pollution control according to their natural and social conditions.

A difference is seen for how they promote air pollution control at the regional level and how they divide the responsibilities. California came up with the regional air basins - areas divided by the topographic conditions rather than political boundaries, and created local AQMDs and APCDs to manage and oversee the basins. The local air districts are responsible for establishing and enforcing regulations (including emission standards) to attain and maintain air quality standards of stationary sources set by the federal and state governments. On the other hand, Japan follows the formal administrative units of wards, cities, and towns for air pollution control. TMG has obtained the major responsibility to establish and enforce regulations and emission standards of stationary sources to attain the air quality standards set by the central government. These differences are because California must oversee a far larger and topographically diverse area and needs a much more efficient way to control air pollution. As for Japan, where the organizational hierarchy is stronger, it is easier to divide roles and responsibilities between the administrative units.

Similarities: Both California and the TMG are able to set more stringent standards than the national standards. Governments and organizations at the regional level are also responsible for formulating and enforcing their own measures and plans.

Organizational Design

The organizational structures for air pollution control in California and Tokyo are compared.

California: The California Environmental Protection Agency (Cal/EPA) is the umbrella cabinet-level agency for all environmental related issues, but does not direct policies and decisions of its underlying boards, departments, and offices (BDOs), such as those responsible for air quality, water quality, and waste management. Instead the organization is responsible for coordinating and supervising strategic management, enforcement, information management, and pollution prevention.[18] All actual decision making regarding specific media, such as air pollution control, standards, and implementation of solutions are relegated to the BDOs.[19] The organizational chart for Cal/EPA can be found in Figure C.1.

[18] http://www.calepa.ca.gov/
[19] http://www.calepa.ca.gov/About/OfficeSec.htm

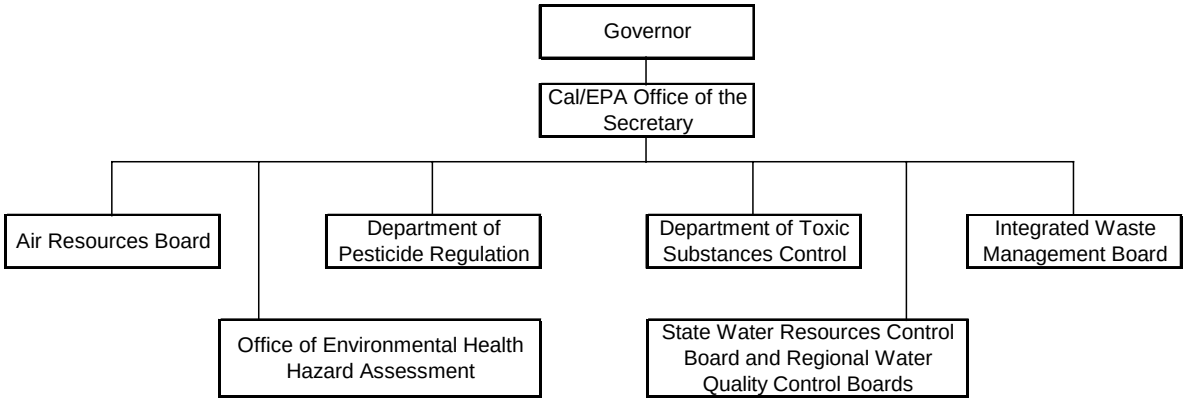


Figure C.1 Organizational Chart for Cal/EPA

The California Air Resources Board (CARB) was created in a merger of the California Motor Vehicle Pollution Control Board and the Bureau of Air Sanitation in 1967 along with its Laboratory, in order to combine the oversight of air pollution that originates from mobile and stationary sources. CARB Board members are appointed by the Governor and serve indefinitely, crossing over numerous gubernatorial administrations – one of the board members has been a member for 15 years. The underlying organization that supports the board has over 1,000 employees including engineers, scientists, attorneys, automotive technicians, information specialists, administrative analysts, and clerical support.[20] The employees of CARB and its underlying organization are continuously serving and do not disband at the completion of a project or after the implementation of a policy.

The purpose of CARB is "(i) to establish air quality standards that may vary from basin to basin; (ii) adopt emissions standards for air pollutants for each basin as found necessary; (iii) inventory all sources of emissions for each basin; and (iv) provide a mechanism for the establishment of regional air pollution control districts within the basins" (CARB, 1972).

Figure C.2 shows CARB's organizational chart. As shown in the figures, CARB focuses on mobile sources more than stationary sources.

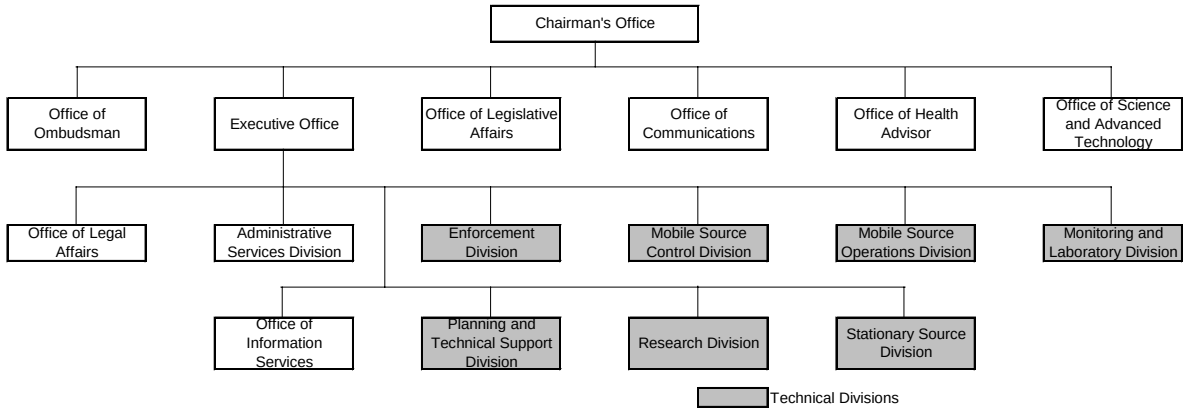


Figure C.2 Organizational Chart for CARB (a)

[20] http://www.arb.ca.gov/as/personnel/jobs/jobs.htm

Each division is further broken down into detailed branches and sections, and they are broken down into even smaller sections (Figure C.3).

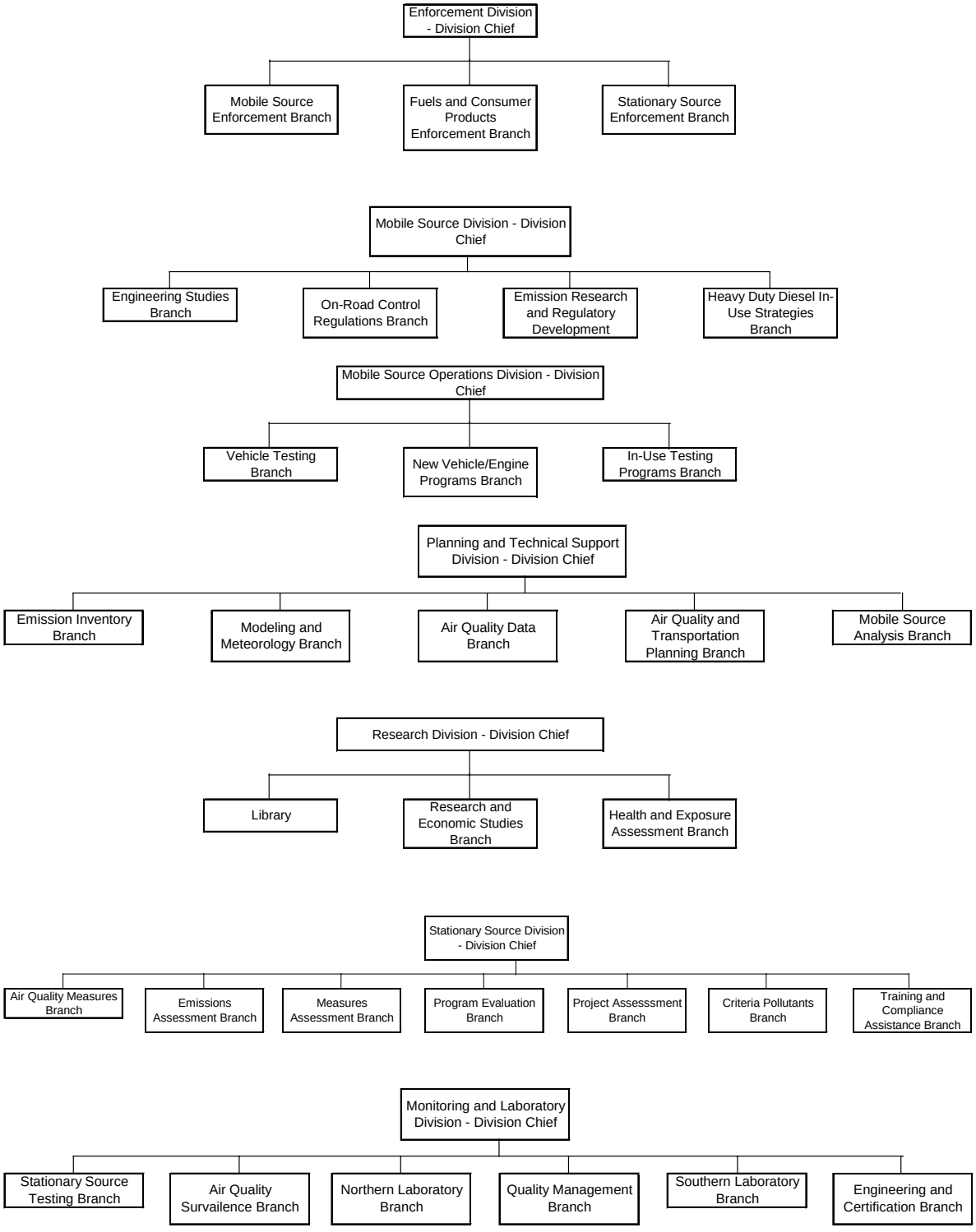


Figure C.3 Organizational Chart for CARB (b)

BOX C.1 Organizational Structure of Local Air Districts

Case of the Bay Area Air Quality Management District (BAAQMD)

In the Bay Area Air Quality Management District (BAAQMD), the organization is divided into two parts (i) the division responsible for operating regulations and measures and (ii) the division responsible for planning, policy, and outreach.

The Compliance and Enforcement Division is responsible for informing regulated businesses about AQMD policies that may affect them; providing support to Bay Area businesses through avenues such as a compliance assistance hotline, industry compliance schools, and an ombudsman; inspecting and auditing Bay Area businesses to ensure compliance with federal, state, and district regulations; regulating other activities that may interfere with attainment and maintenance of health-based air quality standards; investigating individual complaints about stationary source emissions; and providing and reviewing permits for large and small businesses in the Bay Area. The Technical Services Division is tasked with collecting the air quality data via monitoring stations and meteorological monitoring sites; measuring emissions from various stationary sources; and conducting mobile air quality with regard to accidental pollution releases. The Planning, Rules, and Research Division assembles quantitative estimates of air pollutant emissions from all the sources in the district; analyzes the problems; prepares air quality plans and submits them to the state government; develops new rules for air quality compliance; and identifies and provides funding for new clean air initiatives.

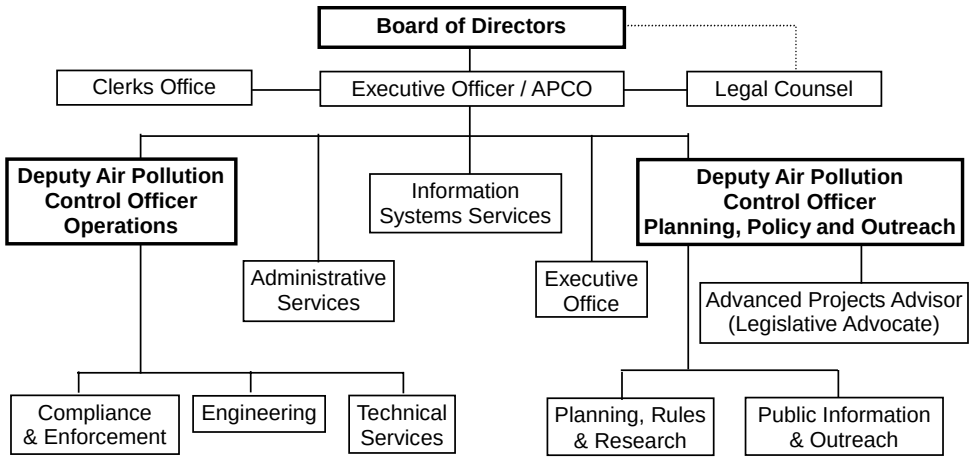


Figure C.4 Organizational Chart for BAAQMD

Tokyo: In 2000, the Bureau of the Environment (BoE) was formed by the merger of the Bureau of Environmental Protection and Bureau of Sanitation. Within the BoE, divisions were formed based on types of issues rather than environmental media - such as the Automotive Pollution Control Division and the Toxic Chemical Management Section, which was a result of a qualitative shift from industrial pollution to urban and lifestyle pollution, most notably air pollution by mobile sources. This change also demonstrated the importance of waste management as part of the environmental problem.

BoE is the main government office in charge of environmental affairs within the TMG. As of 2003, there were over 650 employees in the bureau. Its major responsibilities include undertaking "measures against global warming and the 'heat island' phenomenon; regulation of sources of pollution to prevent air and water pollution; measures to deal with automobile pollution; protection and recovery of nature; waste disposal; environmental impact assessment;

environmental supervision; and regulation of transfer operations."[21] Its organizational structure is shown below in Figure C.5. Note that there is a specific division dedicated to automotive pollution, as it is one of the most prominent issues in Tokyo.

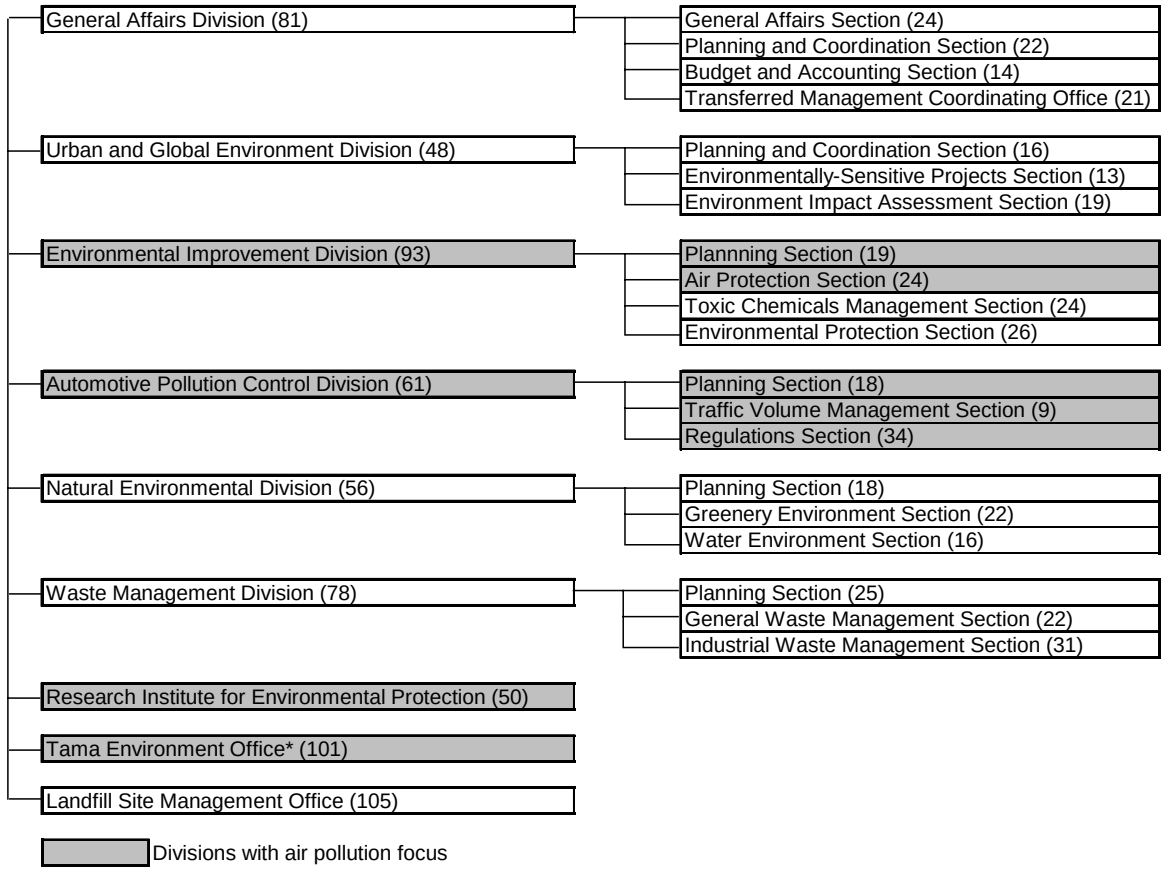


Figure C.5 Organizational Chart for the Bureau of the Environment (a) [22]

Below are the BoE divisions that are focused on air quality and their responsibilities.

Environmental Improvement Division - Planning Section and Air Protection Section:

- Comprehensive promotion of policies related to environmental improvement; and
- Promotion of countermeasures to handle air pollution and measurement of air pollution levels.

[21] http://www.chijihon.metro.tokyo.jp/english/PROFILE/APPENDIX/appendix3.htm

[22] http://www.kankyo.metro.tokyo.jp/kouhou/english2003/index.html
The numbers in brackets are the number of officials as of August 1st, 2003, excluding officials on leave and officials dispatched to wards and clean association of Tokyo 23 (a public cleaning association of the 23 wards of Tokyo). 6,345 officials are dispatched to the wards and association.
Source: http://www.kankyo.metro.tokyo.jp/kouhou/english2003/index.html Jigyo Gaiyo FY 2003, Bureau of the Environment (Japanese).
*The Tama area is outskirt of the Tokyo.

Automotive Pollution Control Division:

- Comprehensive promotion of policies related to countermeasures to handle automotive pollution;
- Guidance of business operators related to motor vehicle emission control measures;
- Subsidies related to motor vehicle emission control measures;
- Regulation of diesel vehicles;
- Promotion of countermeasures to handle automotive traffic volumes; and
- Promotion of countermeasures to handle local pollution and automotive noise and vibrations.

Research Institute for Environmental Protection:

- Dissemination of testing, research, investigation, and technology related to the environment; and
- Examples of the research area related to air pollution for the fiscal year 2004:[23]
  - Research on the influence of carcinogenic substances discharged from diesel cars on the road-side environment;
  - Joint research by local governments on suspended particulate matter (SPM) in the Kanto district;
  - Research on evaluation of hydrocarbon reduction measures;
  - Research on comprehensive evaluation of automobile emissions reduction measures; and
  - Research on the analysis method of toxic air pollution substances.

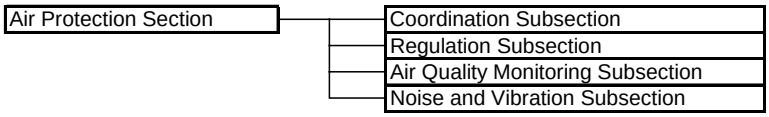
Tama Environment Office:

- The Tama area is located on the outskirts of Tokyo and covers about 2,900 hectares with a population of about 195,000. Recently, TMG has undertaken development in this area with the Urban Renaissance Agency, an independent administrative agency, and the Tokyo Metropolitan Housing Supply Company, a government corporation.[24] The Tama Environment Office is responsible for promoting policies related to the environment in the area, including countermeasures to handle air pollution and measurement of air pollution levels.

Each section is broken down into subsections, which are given specific responsibilities (Figure C.6).

[23] http://www2.kankyo.metro.tokyo.jp/kankyoken/plan/thema.htm (Japanese)
[24] http://www.tama-nt.com/library/profile/data/data03c.html (Japanese)

Air Protection Section under Environmental Improvement Division



All Sections under Automotive Pollution Control Division

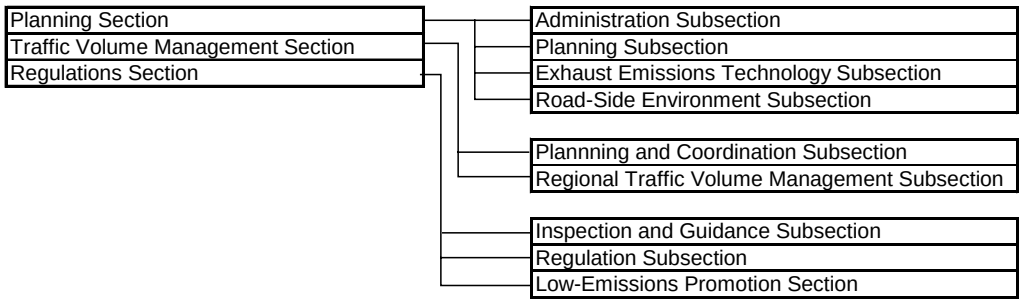


Figure C.6 Organizational Chart for the Bureau of the Environment (b)

Liaison groups are often organized for the issues that extend across more than one bureau. For example, there are liaison groups for the issues of illegal diesel oil and traffic demand management within Tokyo Metropolitan Government.

Comparison: TMG's BoE has organized the institution by pollution source, i.e. by automotive pollution vs. others, as opposed to the organization in California that separates the organization based on medium, i.e. water and air, and then by the cause of pollution - stationary and mobile. Because TMG is more geographically focused and air pollution caused by mobile sources has been more serious than stationary sources, the separation provides an ability to focus more directly on the mobile source issues.

Similarities: Both Cal/EPA's CARB and TMG's BoE have detailed organizational structure, which makes the responsibilities and duties of each section clear. They also have more divisions for mobile sources, which is their major focus regarding air pollution.

Decision-Making Process

This section reviews the decision-making process in Cal/EPA's CARB and TMG's BoE.

California: Both the state and regional environmental organizations (CARB and AQMD) utilize their appointed boards to make the decisions with support from the overall organization to provide detailed information. In order to facilitate decisions and flexibility and reduce discussion without forward movement, the boards are kept small.

The structure of the decision-making boards is permanent. Additionally, the same structure continuously provides support to CARB and the regional AQMDs with regards to research and coordination - it does not change when a project is completed or policy is implemented. Within the organizations there may be personnel turnover due to elections (AQMD) or gubernatorial decisions, but in the current case, most of the members of CARB's Board have been on the

board for at least 5 years. This provides continuity through administrations and also provides ample opportunity to implement various policies, as many may have lengthy implementation durations. However, the limited turnover may stagnate the process as well, since new ideas may not be readily available.

The CARB Board has 11 members comprised of citizens who are knowledgeable about air quality, health, and the legal/regulatory aspects of implementation:

- Five from the four major local air districts, i.e. Air Quality Management Districts (AQMDs) and Air Pollution Control Districts (APCDs)- San Diego APCD, Bay Area AQMD (San Francisco), San Joaquin Valley Unified APCD, South Coast AQMD (greater Los Angeles region) + an additional local air districts. As discussed below, the individuals who serve on the Governing Boards of the local air districts are elected representatives from the counties and cities that are part of the local air district;
- Three members with specific relevant expertise in (i) automotive engineering, (ii) science, agriculture, or law; and (iii) physician, surgeon, or health effects expert. Additionally, one of these 3 individuals must also have expertise in air pollution control; and
- Two members from the public.[25]

The CARB Board meets monthly and is responsible for ensuring that the CARB organization addresses the following aspects of air quality:

- Sets and enforces emission standards for motor vehicles, fuels, and consumer products;[26]
- Sets health-based air quality standards;
- Conducts research;
- Monitors air quality;
- Identifies and sets control measures for toxic air contaminants;
- Provides compliance assistance for businesses;
- Produces education and outreach programs and materials; and
- Oversees and assists 35 local air quality districts which regulate most non-vehicular sources of air pollution.

Note that other State of California departments that would be considered relevant to an air quality discussion, such as CalTrans (Department of Transportation) or Health and Human Services, do not have a voice in CARB. The board makes policy recommendations and then works with the implementing agency, if it is not CARB themselves, to implement the new policy - for example working with the Bureau of Automotive Repair if there is a private automobile test to be implemented.

The CARB Board utilizes the 7 technical divisions to support their decision-making capabilities. These technical divisions act as research and monitoring departments that provide the Board with sufficient information to make decision and move forward on improving air quality in California.

[25] http://www.arb.ca.gov/homepage.htm
[26] Note: Enforcement for standards and other CARB Board decisions comes via the Enforcement Division discussed above or via the enforcement arms of the AQMDs.

The technical divisions are:

Stationary Source Division:[27]

- Provide strategies to bring about low polluting fuels for use in motor vehicles in California;
- Protect the public from exposure to toxic air pollutants;
- Carry out State Implementation Plan (SIP) requirements as they relate to consumer products;
- Provide leadership and guidance to continually improve the efficiency of California's air pollution control program; and
- Maximize outreach to the interested public and those the sate regulates and be sensitive to the needs of those impacted by their programs.

Enforcement Program:[28]

- Enforcement of statutory and regulatory requirements for sources of air pollution under CARB jurisdiction;
- Direct enforcement of mobile sources and consumer products, as well as oversight of the AQMD's enforcement of stationary sources;
- Partner with local or state law enforcement for strategic or focused investigations, such as testing of heavy-duty vehicles at California Highway Patrol weigh stations; however, CARB field inspectors conduct the inspections; and
- Develop and investigate cases and work with CARB's Office of Legal Affairs to settle or litigate the cases.

Mobile Source Program:[29]

This includes both the Mobile Source Control Division and the Mobile Source Operations Division

- Responsible for developing statewide programs and strategies to reduce the emission of smog-forming pollutants and toxics by mobile sources, including both on and off-road sources such as passenger cars, motorcycles, trucks, buses, heavy-duty construction equipment, recreational vehicles, marine vessels, lawn and garden equipment, and small utility engines. CARB requires vehicle manufacturers to develop engine and emission equipment systems that reduce the specific pollutants that cause California's severe air quality problem.

Monitoring and Laboratory Division:[30]

- To provide accurate, relevant, and timely measurements of air pollutants and their precursors to support California's Air Quality Management Program for the protection of public health.

Planning and Technical Support Division:[31]

- Assesses the extent of the State's air quality problems and the progress being made to abate them;
- Coordinates statewide development of clean air plans;
- Maintains CARB's databases pertaining to air quality and emissions; and

[27] http://www.arb.ca.gov/html/ssd.htm
[28] http://www.arb.ca.gov/enf/enf.htm
[29] http://www.arb.ca.gov/msprog/msprog.htm
[30] http://www.arb.ca.gov/html/mld.htm
[31] http://www.arb.ca.gov/html/org/orgptsd.htm

- Applies practical and effective tools to use these data to explain the nature of California's air pollution problems in terms that may be used to design cost-effective strategies to improve the air quality.

Research Division:[32]

- Provide the highest quality scientific information and technology

Using SCAQMD, the district that encompasses the Los Angeles area and is the smoggiest in the US, as an example, it utilizes a Governing Board as the decision making group with support from various standing committees, a Hearing Board, as a check on the Governing Board's policies, and numerous Advisory Committees. Not all local air districts follow this format and may have different mixes of representation and advisory boards because of different regional circumstances.

The SCAQMD's Governing Board is comprised of twelve people, nine of whom are elected officials. Of those nine, four are the county supervisors for the four represented counties.[33] The other five are city council members who represent the four cities in the district; with Los Angeles receiving two board positions. The other board members (3) are appointed by the state: one by the Governor of California, one by the Speaker of the State Assembly, and one by the State Senate Rules Committee. The Board "adopts policies and regulations that promote clean air within its four-county area."[34] Prior to adopting any new policies, the Board discusses the policies at an open hearing - all members of the public, including local businesses, are invited to attend and provide feedback on the policy. The process for new policies at SCAQMD is the following:

- AQMD's Executive Officer and staff recommend new rules or rule amendments to help reduce air pollution to the Governing Board;
- At a public hearing that is well publicized in advance, the Governing Board also hears public testimony on the various policies. All information leading up to and including the board meetings are available through the Freedom of Information Act;[35]
- After a public hearing, the Governing Board may vote to adopt a rule as proposed or with changes;
- In some cases the Governing Board may postpone a decision and instruct AQMD staff to develop a new proposal; and
- In addition, the Governing Board approves contracts, policies and various reports and may also act on budget requests and personnel matters.[36]

The Board is supported by seven standing committees that provide information on various topics to assist the board in making well-informed decisions. The committees include budget/finance, executive, legislative, mobile source, personnel, public outreach, and stationary source.

The Hearing Board was created as a check to balance the power of the Governing Board and although the Governing Board appoints the members, it works independently from the Governing Board. This provides an arena for petitions by companies for variances; petitions for abatement orders; appeals by companies from the granting of permits, permit conditions, permit

[32] http://www.arb.ca.gov/research/research.htm
[33] County Supervisors are elected officials of a specific county. 5 supervisors are elected every 4 years to oversee the management of County government and various special districts.
[34] http://www.aqmd.gov/hb/govbd.html#What_is
[35] Freedom of Information Act: http://www.usdoj.gov/oip/foia_updates/Vol_XVII_4/page2.htm
[36] Ibid.

denials and suspensions, denials of emission reduction credits and denials of pollution control plans; and appeals by third parties. They are not allowed to modify rules; exempt a business from complying with a rule; grant a variance from a violation of the public nuisance law; or review a violation notice in any way.[37]

The Advisory Committees include the following:

Air Quality Management Plan Advisory Group:[38] Includes about 40 members of the community plus three members from the Scientific, Technical, and Modeling Peer Review Advisory Groups. They meet when necessary and are responsible for reviewing the overall aspects of a draft air quality management plan and to make recommendations concerning emission inventories, modeling, control measures, and socioeconomic impacts:

Ethnic Community Advisory Council: Composed of members from the various ethnic communities in the Los Angeles area who are appointed for 2 - year terms. The group meets monthly and has been tasked with assisting AQMD in providing compliance assistance to ethnic businesses; assisting AQMD in evaluating existing ethnic community outreach efforts and in increasing ethnic community participation in air quality management; assisting AQMD in increasing ethnic community participation in AQMD contracting and procurement programs; and assisting AQMD in designing public education and outreach programs for ethnic community members;[39]

Home Rule Advisory Group: A coalition of 30 individuals from local businesses, environmental representatives, and air quality regulators that meets monthly and is tasked with consolidating overlapping federal, state, and local regulations to streamline regulatory compliance and recommending policy changes to the Stationary Source Committee on those issues that needlessly (negatively) impact the regional business community;[40]

Local Government and Small Business Assistance Advisory Group: There are 20 members representing the public, small business, and government who meet monthly and are tasked with making recommendations regarding small business, local government, and community activity emissions; AQMD's communications with small businesses and community-based organizations; AQMD's outreach policies and procedures; and help with partnership building;[41]

Technology Advancement Advisory Group: A group of 12 technical experts from industry, academia, state agencies, the scientific community, and environmental interests who meet semi-annually, and more if necessary. They are tasked with providing an independent review of the technology advancement program; coordinating it with other government activities; assessing the direction of the program with regard to legislative requirements; and identifying new technical areas and resources; and[42]

Scientific, Technical, and Modeling Peer Review Advisory Group: A group of 20 specialists in socioeconomic modeling, air quality modeling, air quality and meteorological monitoring, and atmospheric science, as well as at least one medical doctor meet occasionally to review current

[37] http://www.aqmd.gov/hearbd/hearbd.html
[38] http://www.aqmd.gov/gb_comit/aqmpadvgrp/aqmpadvgrp.html
[39] http://www.aqmd.gov/gb_comit/ethnic/ethnic.html
[40] http://www.aqmd.gov/gb_comit/home%20rule/HomeRuleAdvisoryGroup.html
[41] http://www.aqmd.gov/gb_comit/lgsb/local.html
[42] http://www.aqmd.gov/gb_comit/technology/techadvadvgrp.html

modeling techniques and provide insight on new approaches. It provides AQMD with a link between socioeconomic modeling and air quality modeling.[43]

Particular only to the SCAQMD is the Mobile Source Air Pollution Reduction Review Committee (MSRC). It was created in 1990 to utilize funds[44] specifically to target mobile source emissions because they are such a large contributor to smog in the Los Angeles area, which has made it the smoggiest city in the US. It is supported by a Technical Advisory Committee, which provides primary assistance in program development and reviews and evaluates all proposals submitted for funding based on MSRC guidelines and statutory requirements.

Tokyo: In the TMG, councils are created for specific purposes and on specific topics, such as the Environmental Council, Inquiry Committee on Road Pricing, and the Commission for the Promotion of Environmental Protection. The councils are usually staffed by non-TMG employees who gather to discuss one topic, but disband once the recommendations are made. These councils are supported by secretariats that help to coordinate the process and provide research to the councils. The TMG councils are only able to recommend solutions by using their experiences and gathering opinions from the public, but they are lack the power to implement or enforce solutions. The implementation takes place within the BoE by individuals focused on specific problems (mobile sources, etc.).

Within the TMG, there are nine environmental councils and committees that cover topics such as pollution, nature conservation, toxic substances, waste management, environmental impact assessment, and environmental protection. Three of these councils are described in Box C.2.[45] Based on Japanese national laws and TMG ordinances, these councils are composed of experts from the general public, universities, corporations, non-governmental organizations (NGO), and the national government, but not from TMG. The results of the councils' discussions are reflected upon in the environmental policies of TMG. The research that is undertaken by the Research Institute for Environmental Protection is also discussed within a working committee. Its members include university professors, researchers from the National Institute for Environmental Studies, an individual from the general public, and a chartered accountant.

[43] http://www.aqmd.gov/gb_comit/stmpradvgrp/stmpradvgrp.html
[44] Motor vehicle registration costs in the SCAQMD are $4 higher than the rest of the state and that money is used for mobile source programs in the SCAQMD based on CARB and other state legislation.
[45] http://www.kankyo.metro.tokyo.jp/gijisokki.htm (Japanese)
Jigyo Gaiyo FY 2003, Bureau of the Environment (Japanese)

BOX C.2 Example of Council and Commission in TMG

Tokyo Environment Council (Tokyo Kankyo Shingikai)

- Discuss and provide advice regarding the TMG master plan for the environment;
- Discusses other topics related to basic environmental protection issues;
- Includes three sub-councils: (i) planning; (ii) air and noise; and (iii) water and soil sub-committees; and
- Up to 42 members are appointed by the governor. As of December 2003, the council consisted of 21 members and 5 provisional members.

Table C.1Table: Members of Tokyo Metropolitan Environment Council

	Affiliation	Number
Members	University Professors	14
	Research Institute	2
	Tokyo Chamber of Commerce and Industry	1
	Environmental Education	1
	Research Society and University Emeritus	1
	Editorial Board of Newspaper and University Professor	1
	Lawyer	1
Provisional Members	University Professors	2
	Japan Federation of Economic Organizations	2
	Chairman of Architectural Association	1

Tokyo Metropolitan Inquiry Committee on Road Pricing

- Tokyo has been researching the implementation of a road pricing system, which would assess a toll on vehicles entering or traveling through specific zones during certain hours.[46] Since the receipt of the report, TMG has been active in gathering opinions from the public and business people and has been aggressively studying ways to introduce a road pricing system in Tokyo; and
- Members include 18 academic experts and 17 government officials.

Table C.2 Members of the Tokyo Metropolitan Inquiry Committee on Road Pricing

	Affiliation	Number
Academic Experts	University Professor (includes 1 Assistant Professor)	12
	Tokyo Chamber of Commerce and Industry	2
	Japan Automobile Federation	1
	Automobile Critic	1
	Motor Journalist	1
	Lawyer	1
Government Officials	Ministry of Land, Infrastructure and Transport	7
	National Police Agency	3
	Ministry of Economy, Trade and Industry	3
	Ministry of the Environment	1
	Ministry of Public Management, Home Affairs, Posts and Telecommunications	1
	Metropolitan Expressway Public Corporation	1
	Metropolitan Police Department	1

Tokyo Metropolitan Commission for the Promotion of Environmental Protection

- Discuss and implement research regarding environmental administration;
- Reflect opinions of the general public and promote environmental administration through public participation; and
- Members include 18 local government nominees and 10 individuals from environmental NGOs.

[46] http://www.kankyo.metro.tokyo.jp/kouhou/english2003/index.html
http://www2.kankyo.metro.tokyo.jp/koutyo/suisin/

TMG utilizes secretariats extensively within their organization. Secretariats are an administrative unit responsible for maintaining meeting records and undertaking other secretarial duties. Within each of the councils and committees discussed above, secretariats play an important role in supporting members in their decision-making. Their responsibilities include:

- Setting meeting agendas with support from council or committee members;
- Providing basic information on the jurisdictional areas, other regions, or topics;
- Arranging surveys and research to be used by the councils and committees;
- Coordinating with other divisions or sections. For example, if new measures are proposed and other sections or divisions are responsible, the secretariat confirms the content and schedules the implementation of the measures or checks the progress of the implementation of measures under other divisions or sections purview;
- Preparing materials to be used during meetings, including production of some documents;
- Arranging and notifying members of meeting time and location; and
- Recording the meeting minutes.

Secretariats are flexible in that they rotate based on the council's topic. For example, the General Affairs Division's Planning and Coordination Section is the secretariat for the Tokyo Metropolitan Environment Council and the Tokyo Metropolitan Commission for the Promotion of Environmental Protection, whereas the Automotive Pollution Control Division's Traffic Volume Management Section is the secretariat for the Tokyo Metropolitan Inquiry Committee on Road Pricing.

Comparison: In California Air Resources Board and the regional AQMDs/APCDs all have permanent boards as decision makers, whereas Tokyo has temporary councils that disband once recommendations to TMG have occurred. This difference may come from the fact that Japanese place emphasis on a group consensus among experts, public, and/or other members such as central government officials and members of NGOs.

Similarities: The members of boards, advisory groups, and councils in California and Tokyo include experts in the related fields and sometimes the public. The public is also able to participate in the policymaking phase by attending meetings and/or providing opinions to draft plans and measures. There are boards, advisory groups, and councils in California and Tokyo that discuss on specific topics.

Air Quality Monitoring and Data Collection from Industrial Locations

In this section, the mechanisms for monitoring air quality monitoring in California and Tokyo are introduced.

California: CARB operates a statewide network of monitoring stations. The data from this network is supplemented with data collected by additional monitoring stations that are operated by the local air districts, other public agencies, and private contractors. Private contractors are contracted as unbiased third parties to operate monitoring stations for businesses and industries that are required by permit conditions to monitor themselves. There are more than 250 criteria pollutant monitoring sites and CARB also monitors ambient toxic air contaminants at 18 of these sites. The data is stored in a comprehensive air quality database maintained by CARB. This data is also available online and through the annual California Almanac of Emissions and Air Quality. The local air districts collect detailed information on stationary sources using various formats.

Tokyo: The national government's Clean Air Act states that the prefectural governments are responsible for monitoring air quality. TMG has installed 47 general atmospheric monitoring stations and 35 roadside monitoring stations throughout Tokyo. They monitor the pollutants specified by the Environmental Quality Standards (i.e. NO_2, SPM, photochemical oxidants, SO_2, and CO) and others such as NO, CH_4, non-methane hydrocarbons, wind direction, wind velocity, temperature, and humidity. Data is sent to TMG offices via a telemeter-based online system every hour. Data from the stationary sources is collected and gathered via an online system, as they are equipped with measuring devices that electronically send the necessary information. The wards, municipalities, and towns are also equipped with monitoring stations in order to understand their air quality, the results of which are used to formulate air pollution improvement plans and measures. Business operators of stationary sources submit forms that describe their facilities to both the TMG, as requested by the national government's Clean Air Act, and to ward or municipal governments, as requested by TMG's Environmental Preservation Ordinance. This data is also transferred electronically to calculate the emissions. TMG provides data online and publishes an annual Summary of Air Quality Monitoring and Report of Smoke and Soot Emissions Survey.

Comparison: Both California and Tokyo are equipped with air quality monitoring stations and data is comprehensively collected and published online for public review. Both summarize and publish the results from monitoring stations that are operated at individual businesses. Slight differences are seen in organizations responsible for operating monitoring stations and collecting data from businesses.

Public Participation

Throughout the decision-making process in both California and TMG, public participation is encouraged through public meetings, public forums, release of government documents, and public relations activities. Both organizations also include citizens on their boards or councils and have appeals processes that help to complete the feedback loop. This encourages the public, local businesses and industry, and NGOs to share their opinions. This open forum prevents plans and measures from being created only among experts.

BOX C.3 Roles of Residents Written in the Tokyo Metropolitan Basic Environment Ordinance

Residents in Tokyo are responsible for considering how to alleviate the environmental loads, prevent pollution, and preserve the natural environment in their daily life, as well as for cooperating on measures implemented by TMG, wards, municipalities, and towns (Article 7).

(4) Local Government Air Pollution Control Mechanisms

This section discusses California and Tokyo's local government air pollution control mechanisms. This is summarized in Table C.3.

Table C.3 Essences of Regional Air Pollution Control

Similarities (repeated)	Mechanisms
Roles and Responsibilities of Governments	
The governments of California and Tokyo are able to set more stringent standards than the national standards. Governments and organizations at the regional level are also responsible for formulating and enforcing their own measures and plans.	It is important to establish regulations and to formulate plans and measures specific for each region because there are topographic and social differences between areas. It is also important to provide local governments with the authority to implement plans because local governments know more about the region than do other higher levels of government.
Organizational Design	
Both Cal/EPA's CARB and TMG's BoE have a detailed organizational structure, which makes the responsibilities and duties of each section clear. They also have more divisions for mobile sources, which is their major focus regarding air pollution.	Having detailed organizational structures reflects that the organizations know their responsibilities and policies. It also reflects that the officials in each division/section are tasked with specific jobs.
Decision-Making System	
The members of boards, advisory groups, and councils in California and Tokyo include experts in the related fields and sometimes the public. The public is also able to participate in the policymaking phase by attending meetings and/or providing opinions to draft plans and measures. There are boards, advisory groups, and councils in California and Tokyo that discuss specific topics.	Scientific and technical inputs and public participation are important during the decision-making process. Decision-making or proponent groups that discuss specific topics should be available.
Air Quality Monitoring and Data Collection from Stationary Sources	
Both California and Tokyo are equipped with air quality monitoring stations and data is comprehensively colleted and provided to the public online. Both California and Tokyo summarize and publish the results of the monitored air quality as well as the information reported by businesses. The data are also utilized for their decision-making.	It is important to gather accurate air quality data from well-distributed air quality monitoring stations. It is also important to summarize and publish the results of the monitored air quality as well as other collected information. The data provides basic information on regional air quality to be utilized in the decision-making process.
Public Participation	
Throughout the decision-making process in both California and TMG, public participation is encouraged through public meetings, public forums, release of government documents, and public relations activities. Both organizations also include citizens on their boards or councils and have an appeals process to help complete the feedback loop. This encourages the public, local businesses and industry, and NGOs to share their opinions. This open forum prevents plans and measures from being created only among experts.	Involving the public in the decision-making process is important. Public participation can occur in various formats.

C3 Application of the Essences to the Tehran Province

(5) Current Situation, Comparison with California and Tokyo, and Possible Improvements

Social and Geographical Background

Iran places the value of Islamic religion as a basis for its politics. This is exemplified by the placement of the Supreme Leader, a legal scholar of the Islamic religion, as the highest official authority, and the President being the second highest. On the other hand, struggles to balance the nationalistic values and the desire for liberalization has been noted on a number of occasions.

Iran has a very centralized system, far more centralized than Japan, which in turn is more centralized than the United States. Many departments and ministries of the central government have their directorates in the provinces and the provincial directorates are responsible for enforcing laws and measures formulated by the central government. Iran is divided into 28 provinces, and provincial governments also oversee activities of the provincial directorates. Municipalities are authorized to formulate plans, measures, and municipality laws to the extent allowed.

Population of the Tehran Province was 11.2 million in FY 1996, and the area is 19,196 square kilometers. The province includes 12 administrative districts called Shahrestan, which are further divided into Bakhshes, cities, and Dehestans. Tehran City, the capital of the province, is an important center of industry and commerce of the nation. In 2002, there were about 3.4 million vehicles registered in the Tehran City[47].

Current Air Quality

The Study Team estimated emissions of air pollutants in the Greater Tehran Area in 2002. The mobile sources account for 90% or more for CO and HC emissions, 70% for NOx and PM10 emissions, and 18% for SOx emissions. These figures show that automotive air pollution is the main issue in Tehran, as it is in California and Tokyo.

Roles and Responsibilities of Governments

Current Situation: The Department of the Environment (DOE) sets the ambient air quality standards and emission standards for stationary and mobile sources. They also formulate comprehensive plans for alleviating air pollution in Tehran Province. DOE-TPD, the Tehran provincial directorate of DOE, is mainly responsible for enforcing laws and measures and monitoring air quality in their province. DOE-TPD is able to make the case to DOE for more stringent standards and DOE is able to set standards that are specific to Tehran Province. In the Municipality of Tehran, there is not a section that handles air pollution issues as a major task. Instead, in 1993, the municipality established a semi-municipal corporation that conducts studies on various topics of air pollution and roadside air quality monitoring. The municipality itself handles transport issues such as transportation measures and plans, traffic control, public transportation system, and establishes and operates vehicle inspection centers.

Comparison with California and Tokyo: DOE-TPD has less authority than Cal/EPA and TMG, but it is still able to make the case for more stringent standards to DOE. Another difference is

[47] Metropolitan Tehran Transportation and Traffic Information "At a Glance" 2003-2004 by Tehran Comprehensive Transportation & Traffic Studies (TCTTS).

that transportation is handled at the municipality level whereas it is mainly handled at the state or province level in California and Tokyo.

Possible Improvements: More personnel and authority should be transferred to DOE-TPD, so that plans and measures can be formulated according to the local conditions. This may take time, as it requires capacities regarding personnel and budget, but it will surely be necessary when economical and social activities of other provinces grow, and air pollution control measures become necessary nationwide.

Organizational Design

The organizational structures of DOE, DOE-TPD, and the Municipality of Tehran are reviewed.

Current Situation: Figure C.7 shows the organizational structure of DOE. The Human Environment division is divided according to media and the Air Pollution Research Bureau is further divided into sections for noise, air pollution, air quality monitoring, and global environmental issues such as ozone layers and climate change.

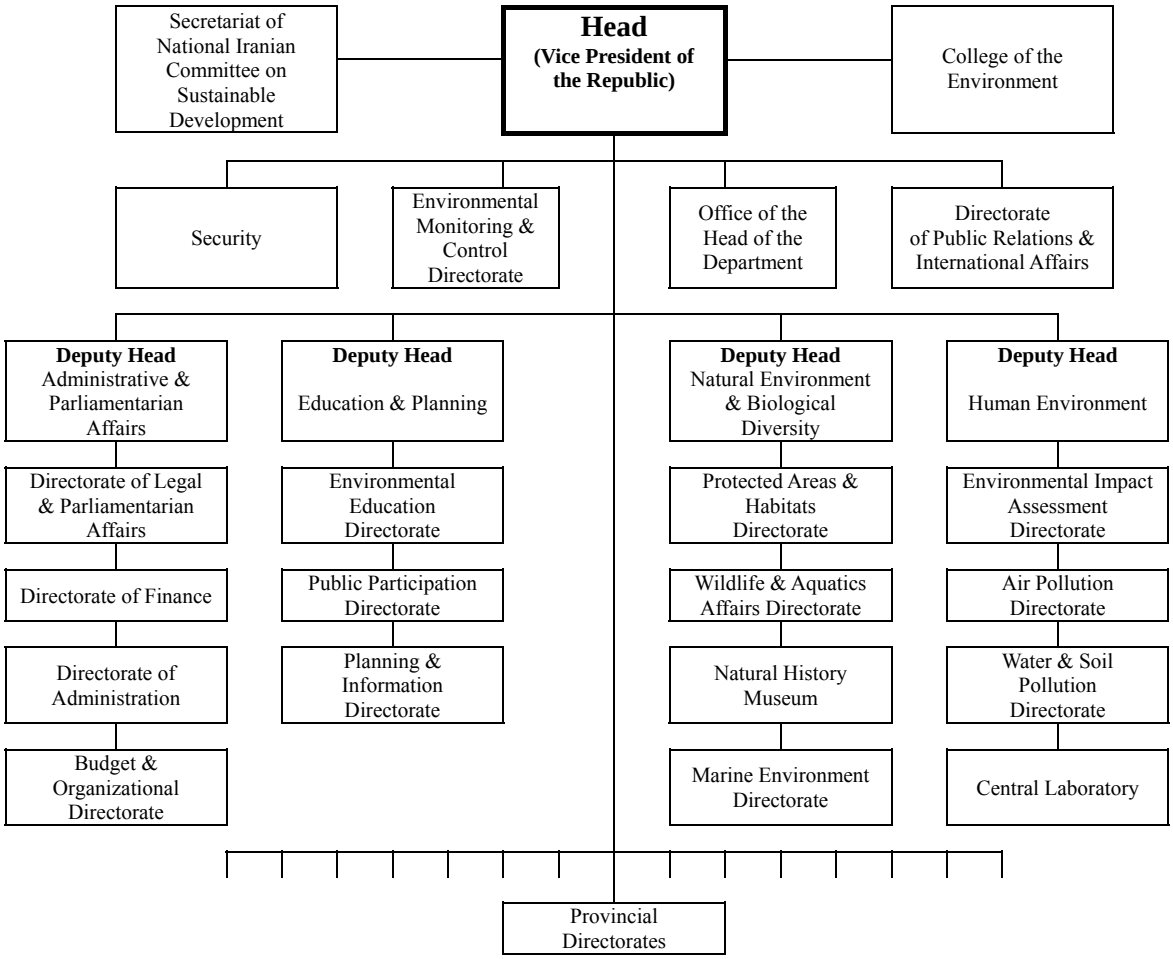


Figure C.7 Organizational Chart of DOE

Air Pollution Directorate

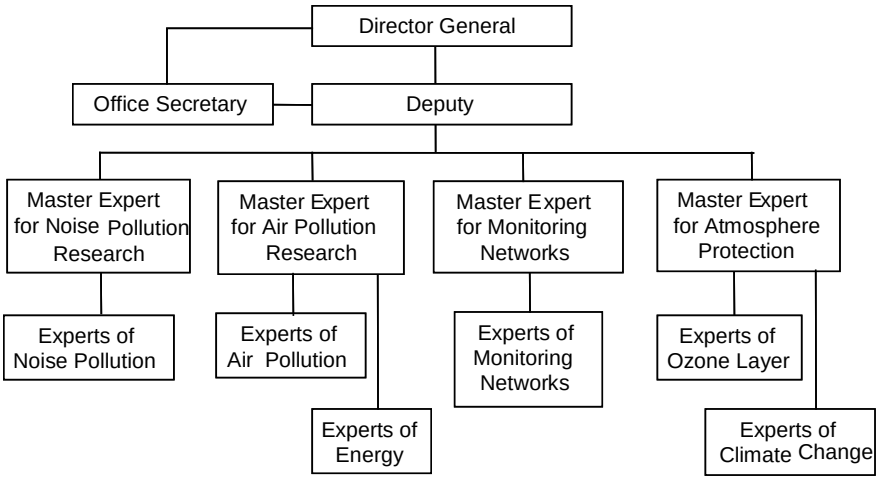


Figure C.8 Organization Chart of Air Pollution Directorate

One of the characteristics of DOE-TPD is that it divides the responsibility of law enforcement for stationary emission sources among the Deputy in Human Environment (responsible for entire Tehran Province except for Tehran City and Karaj City), Tehran Environmental Office (responsible for Tehran City), and Karaj Environmental Office (responsible for Karaj City) (Figure C.9).

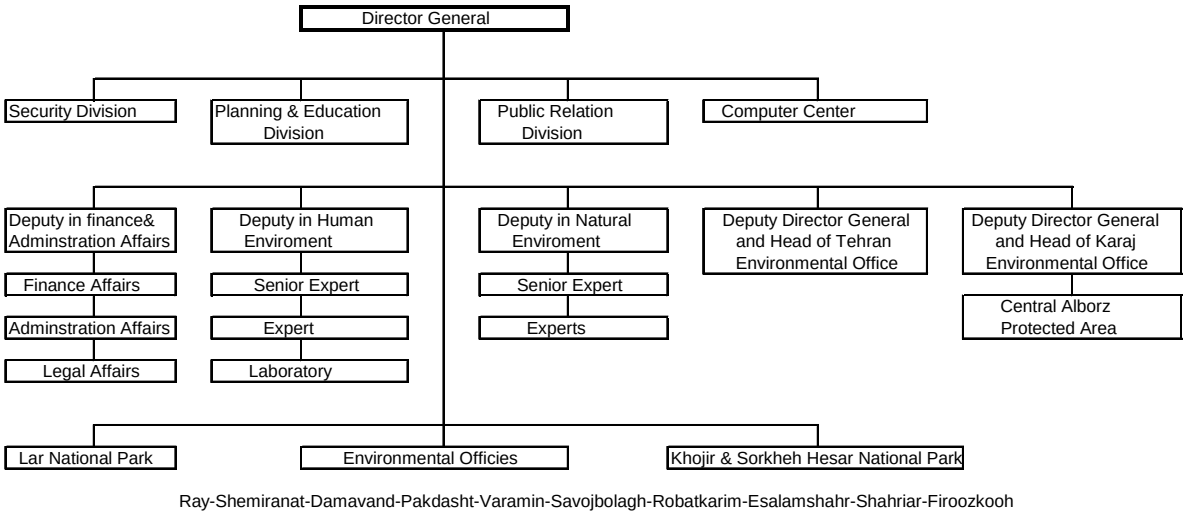


Figure C.9 Organizational Chart of DOE-TPD

Deputy in Human Environment is responsible for enforcing laws and standards for stationary sources in the Tehran Province except for those in the cities of Karaj and Tehran. This responsibility is fulfilled through inspecting industrial units when requested by Ministry of Industry, citizens, or at random, and for issuing DOE's comments on establishment of factories.

The Deputy is also responsible for air quality monitoring in Tehran Province through Laboratory. The division is broken down into (i) environmental impact assessment, (ii) air pollution, (iii) noise, and (iv) water sections.

The *Deputy Director General and Head of Tehran Environmental Office* and the *Deputy Director General and Head of Karaj Environmental Office* are responsible for the same tasks of controlling stationary emission sources as the Deputy in Human Environment for the cities of Tehran and Karaj, respectively. They are both further broken down into (i) human environment, (ii) law, and (iii) public relations sections (In addition there is the Central Alborz Protected Area section for Karaj). The human environment section is in charge of inspecting industrial units and dealing with complaints about industrial units from the public, the law section is in charge of enforcing penalties, and the public relations section is in charge of reporting the results of inspections to newspaper companies.

The *Laboratory* is officially under the supervision of the Deputy of Human Environment, which is practically under the direct supervision of Director General of DOE-TPD. It is responsible for monitoring air and water quality and testing samples of water, air, and soil, as well as measuring noise in Tehran Province.

Figure C.10 shows the organizational chart for the Municipality of Tehran. There is a division for traffic and transportation, which is responsible for formulating and implementing transportation plans and measures as well as operating vehicle inspection centers. This division also conducts studies on various topics of air pollution and roadside air quality monitoring through the Air Quality Control Company (AQCC), a semi-municipal corporation.

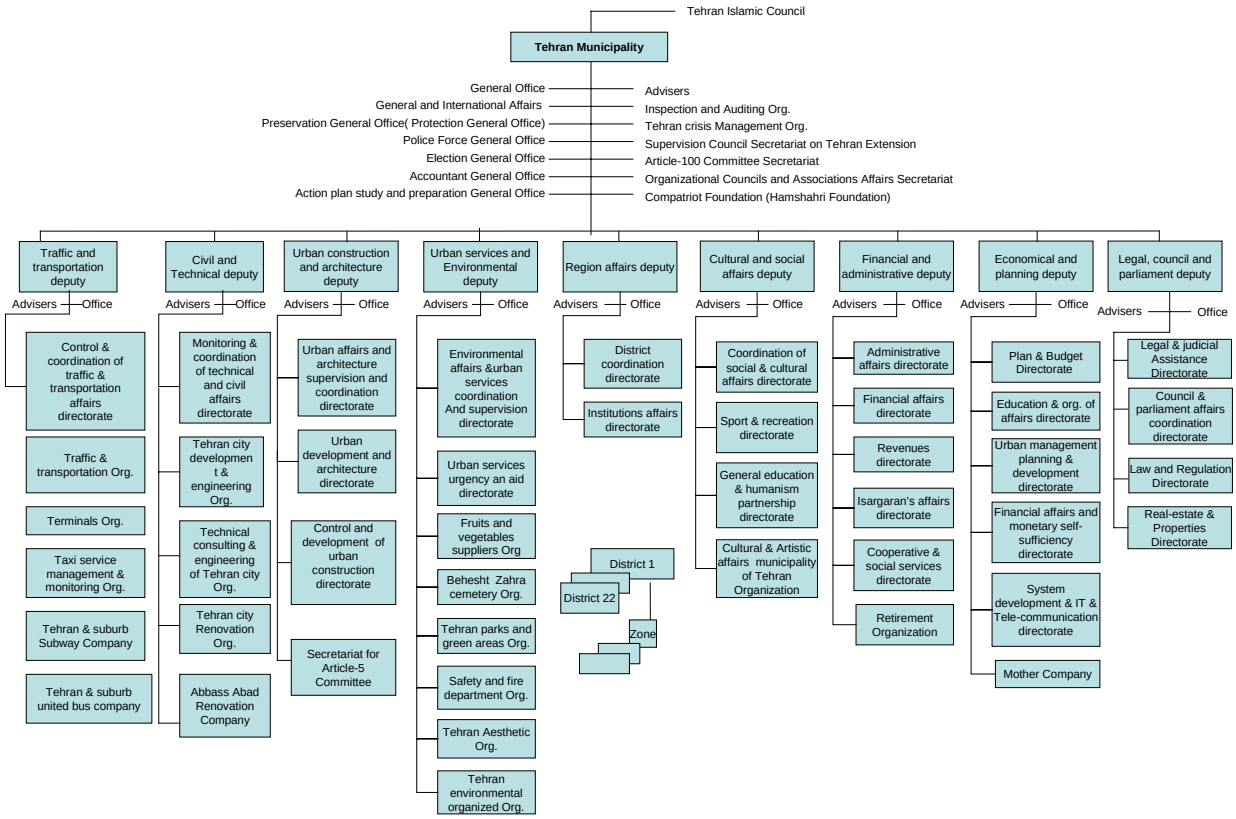


Figure C.10 Organizational Chart of Municipality of Tehran

Comparison with California and Tokyo: Divisions between DOE and DOE-TPD are quite clear as to which environmental medium or field they are responsible for. However, they lack clarity in outlining which administrative process they are responsible for: planning, enforcement, evaluation, or coordination. They are also unclear what type of air pollution issues they emphasize.

Possible Improvements: Organizational structures for DOE and DOE-TPD can be further broken down into or renamed so that which administrative process they are responsible and what kind of air pollution issues they see as important become clear. As a matter of course, changes should be made based on policies, plans, and responsibilities of each organization.

Decision-Making Process

Current Situation: Much of the decision-making regarding air pollution is supposed to be done by the Executive Committees for the Reduction of Air Pollution, which are to be formed in the provinces that include cities of Tehran, Mashad, Tabriz, Ahwaz, Arak, Shiraz, and Isfahan. The below points outline the responsibilities and the composition of the Executive Committee in Tehran Province:

- Aimed at lowering Tehran's air pollution to World Health Organization (WHO) standards;
- In charge of formulating policies, plans, and programs to mitigate air pollution in Greater Tehran through coordination among relevant ministries and organizations;
- Chaired by Deputy Head of Department of the Environment;[48]
- Secretary - Director General of DOE-TPD;
- 9+ other agencies are represented: Ministries of Oil; Industries and Mines; Health and Medical Education; Interior; Post, Telegraph, and Telephone; and Agriculture Jihad; Islamic Republic of Iran Broadcasting (IRIB), Tehran Municipality, Traffic Police; and
- Incorporates one subcommittee, The Public Awareness Campaign and Education Subcommittee, on which representatives of several NGOs participate.

Comparison with California and Tokyo: As shown above, the members of the Executive Committee are mainly the government officials from various agencies, whereas in California and Tokyo, the decision makers or proponents are staff within the division responsible of air pollution, experts outside the government, the public, and others. There are a few discussion groups that handle specific topics.

Possible Improvements: The above differences demonstrate that the Executive Committee has an additional role to formulate policies and measures and supervise the progress of plans, which are functions also seen in California and Tokyo. The additional role of the Executive Committee is the coordination of many agencies, which should require substantial preparation and follow-up work by the Secretariat. Therefore, it can be understood that a one-person secretariat is clearly inadequate. The roles of Tokyo's Secretariats should be used as a reference to improve the Executive Committee's Secretariat because many of their objectives are similar - they coordinate different divisions and organizations within and outside TMG, prepare and conduct follow-up meetings, and arrange research for the council or committee members, who are usually not TMG officials.

As air pollution issue covers various fields such as air pollution from mobile sources, stationary sources, monitoring system, and fuel usage, opportunities for focused discussions with experts

[48] In other provinces, Governors chair the committees.

in the fields should be secured. The TMG councils and California's SCAQMD Advisory Committee should be used as a reference to Tehran. They can either be permanent or temporary groups.

Air Quality Monitoring and Data Collection from Stationary Sources

Current Situation: Several agencies conduct air quality monitoring for their own purposes in Tehran. There are 15 monitoring stations in total owned by DOE, Air Quality Control Company (AQCC), Ministry of Health (MOH), and Research Institute of Petroleum Industry (RIPI) affiliated with Ministry of Oil.[49] A monitoring center was established in DOE-TPD in 2000 and a centralized monitoring system using a data logger and telemeter system was started. Data collected by AQCC is disclosed online. AQCC also collects emission data from the industrial sector.

Comparison with California and Tokyo: There are several serious problems regarding air quality monitoring in Tehran: maintenance of the equipment, allocation of monitoring stations, and the integration of data collected by different organizations.

Possible Improvements: As mentioned above, maintenance of monitoring equipment, allocation of monitoring stations, and integration of data collected by different organizations should be improved. In addition, results of air quality monitoring and data from businesses can be summarized and published for public use. This not only provides information to the public, but the compilation may make decision-making easier.

Public Participation

Current Situation: NGOs are very active in Iran. Among the vast number of NGOs, there are 460 registered environmental NGOs across the country and 105 are situated in Tehran.[50] Their activities include organizing seminars and workshops, disseminating information, creating publications, advocating to governmental policy, networking of domestic and international NGOs and other sectors, and requesting cooperation from international organization.

Comparison with California and Tokyo: NGO activities are very active in Iran. The number of registered NGOs is comparable to the number of registered non-profit organizations (NPO) and voluntary groups in Tokyo[51]. Public relations activities are also conducted to some extent; however, very little participation of NGOs and the pubic at the planning phase of policy making has been observed.

Possible Improvements: Direct involvement of the public in decision-making process is needed. This could include inviting them to be members of committees and publishing draft plans and measure to solicit public feedback. More indirect involvement of the public through open committee meetings and releasing government documents would also help to close the feedback loop.

(6) Summary

A summary of possible improvements for managing air pollution control in Tehran is shown below and is based on mechanisms noted in the institutional organizations of California and Tokyo.

[49] Eleven are real time monitoring stations. Eighteen stations will be installed by the World Bank's loan scheme.
[50] According to the interview from Department of Education and Planning, DOE.
[51] There are 112 NPOs and voluntary groups registered in Tokyo as of October 2004.

Transferring Authorities to the Local Organizations: More personnel and authority should be transferred to DOE-TPD so that they can formulate plans and measures according to the local conditions. This may take time, as it requires increased capacity in personnel and budget. However, in the long-term it will be necessary because economic and social activities of other provinces will increase and air pollution control measures will become a focus nationwide.

Detailed Organizational Structures: Organizational structures for DOE and DOE-TPD can be further disaggregated or renamed so that the administrative process they are responsible for and the type of air pollution issues they see as important are clarified. As a matter of course, changes should be made based on policies, plans, and responsibilities of each organization.

Improving the Coordination Functions for Decision-Making and Enhancing Focused Discussions: The coordination function of the secretariat for the Executive Committee should be strong because so many ministries and organizations are involved. The role of secretariats in TMG can be applicable. As air pollution issues come from various sources including mobile sources, stationary sources, monitoring system, fuel usage, opportunities for focused discussions with experts in the fields should be secured. TMG councils and California's AQMD Advisory Committees should be of referenced. In Tehran, the groups can either be permanent or temporary.

Obtaining and Understanding Accurate Information on Air Quality: Maintaining monitoring equipment, allocating monitoring stations, and integrating data collected by different organizations should be improved. In addition, results of air quality monitoring and data from businesses can be summarized and published for public use. This not only provides information to the public, but the compilation may make decision-making easier.

Promotion of Public Participation to Policy Makings: Direct involvement of the public in decision-making process is needed. This could include inviting them to be members of committees and publishing draft plans and measure to solicit public feedback. More indirect involvement of the public through open committee meetings and releasing government documents would also help to close the feedback loop.

Appendix D Emission Estimate

D1 Overview of Air Pollution Levels in GTA in 2002

Stationary sources account for more than three forth of the total SOx emission. On the contrary, mobile emission sources contribute nearly three forth of NOx emission. Emissions of CO and HC are primarily attributed to mobile emission sources contributing 99% and 86% of the total emission respectively. Emission value of particulate matter is nearly identical between stationary and mobile sources.

Table D.1 Emission Amounts of Pollutants in Greater Tehran Area (2002)

Source	SO_X	NO_X	CO	HC	TSM
Stationary (1000 tons/year)	40	38	11	26	17
Mobile (1000 tons/year)	8	107	1,419	155	19
Total (1000 tons/year)	48	145	1,430	181	36
Stationary (%)	83	26	1	14	47
Mobile (%)	17	74	99	86	53

Source: JICA Study Team

S*Ox:* SOx encompasse sulfurous acid gas (SO_2) and Sulfur trioxide (SO_3). Human exposure to sulfur dioxide aggravates existing respiratory and cardiovascular disease. Asthmatics and individuals with chronic lung and/or cardiovascular disease, children, and the elderly are most susceptible. SOx signify their health effects by accompanying presence of suspended particulate matters (SPM) through absorption and adsorption on the surface of small particles.

NOx: The human respiratory system is susceptible to effects caused by exposure to nitrogen dioxide. Asthmatics are particularly sensitive to these effects. NO has higher affinity to hemoglobin than CO does. NO_2, contrary to SO_2, is insoluble in water and thereby is not absorbed through mucous membrane of the respiratory organ but delivered to the deeper pulmonary alveolus, which may induce pulmonary edema.

CO: Carbon monoxide can exert toxic effects on humans by limiting oxygen distribution to organs and tissues. People with impaired circulatory systems are more vulnerable at lower levels than healthy individuals. Exposure to carbon monoxide can impair visual perception; work capacity, manual dexterity, learning ability, and the performance of complex tasks.

HC: Hydrocarbons are sources of oxidant having various health effects including respiratory disease, stimulus to eyes or carcinogenic.

TSM: Particulate matter (Total suspended matter) with a diameter of less than 10 micrometers are referred to as PM_{10} while very fine particles, equal to or less than 2.5 micrometers in diameter are referred to as PM2.5. Human exposure to particulate matter can affect breathing and the defenses of the lungs, and aggravates existing respiratory and cardiovascular disease. Particulate matter that is less than 10 microns in diameter is especially problematic because it can penetrate deep into the lungs and remain there.

The following part discusses the estimation methods in pollutant emission from stationary and mobile sources.

D2 Pollutant Emission from Stationary Sources

D2.1 Overview

The table and figure below present changes in pollutants emission from stationary sources for the period from 2000 to 2002. The years are presented in the Gregorian calendar in parallel with the Iranian Calendar.

In interpreting the data presented below, care should be taken:

- For uncertainties inherent to pollutant estimation (refer to D2.4 Advantages and Disadvantages of the two level estimates and Uncertainties);
- Limited comparability with the estimate in 1997 due to the difference in information sources and methodology (D2.5 Comparability between the estimate in 1994[1] and 2002); and
- Not to understate or overstate the importance of a change in air pollutants for one three-year reporting period.

Table D.2 Changes in Pollutants Emission from Stationary Sources for Three Years

Unit: 1000 Ton/Year

Years and Sources		SO_2	NO_2	CO	HC	TSM
2000 (1378-79)		50	41	12	28	19
	Industry	23	6	1	3	3
	Domestic/Commercial	19	30	9	22	14
	Other	8	5	2	3	2
2001 (1379-80)		47	38	11	26	17
	Industry	19	6	1	3	3
	Domestic/Commercial	16	27	8	20	12
	Other	11	6	2	3	2
2002 (1380-81)		40	38	11	26	17
	Industry	15	5	1	3	2
	Domestic/Commercial	16	27	8	20	12
	Other	9	6	2	4	2

The years in the parenthesis are those in the Iranian calendar.

[1] The last JICA study estimated pollutants emission based on the data in 1994.

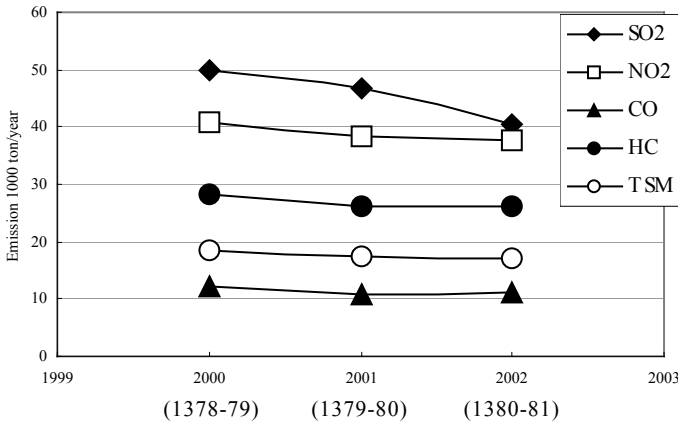


Figure D.1 Changes in Pollutants from Stationary Sources

D2.2 Methodology

Two levels of estimate were carried out for the pollutants emission within the territory of GTA for data verification purpose with due consideration on general uncertainties underlying the emission estimate methodology and more specifically the derivation process of fuel consumption for each emission source. The data presented above corresponds to the second level estimate.

The first level of estimate: Enables emission estimate for different energy sources. The data used in the first level estimate are summarized below:

For Fuel Consumption Data

- Total fuel consumption data within GTA with respect to i) Gasoline, ii) Kerosene, iii) Gas-oil and iv) Heavy oil, acquired from NIOC; and
- Total natural gas consumption data within GTA obtained from NIGC.

For Emission Factors

- The emission factors for each fuel type i) Gasoline, ii) Kerosene, iii) Gas-oil and iv) Heavy oil, obtained from IFCO; and
- The emission factors for natural gas from IFCO.

The second level of estimate: As presented in Table D.2, enables emission estimate from different sources i) Industry and Workshop, ii) Domestic and Commercial and iii) others (e.g. power plants). This categorization was made in accordance with the spirit behind Iranian Air Pollution Control Law.

The data used in the second level estimate are summarized below:

For Fuel Consumption Data

- Fuel consumption data within GTA separately for i) Industry and Workshop, ii) Domestic and Commercial and iii) others (e.g. power plants), acquired from NIOC; and
- Total natural gas consumption data within GTA obtained from NIGC.

For Emission Factors

- The emission factors for each fuel type and for each category i) Industry and Workshop, ii) Domestic and Commercial and iii) others (e.g. power plants) from IFCO; and
- The emission factors for natural gas from IFCO.

D2.3 Results

The tables of the estimate are given in Table D.6 Pollutant Estimate by the First Level and D.21. Estimation of the total air pollution emission of stationary sources by fuel type.

D2.4 Advantages and Disadvantages of the Two Level Estimates and Uncertainties

The first level estimate is performed to have an upper bound estimate of pollutant emission, in which pollutants emission was estimated on the total fuel consumption data obtained from NIOC. The data of NIOC on fuel consumption is the record of fuel sales within GTA, therefore, it is judged a best reliable data source as a surrogate for energy consumption. However the information available within NIOC is not tabulated separately for emission sources, thus, the disadvantages of the first level estimate are i) potential inclusion of emissions from mobile sources and ii) inability in separate estimate for each emission source. To minimize a bias generated by the said disadvantage, the pollutants emission from gasoline was deducted in the estimation (Table D.5) as more than 97% of the total gasoline consumption in Iran is normally related to the mobile sources, while, the rest is associated with the minimal consumption by small devices like household electricity generators and small gasoline fueled water pumps used for agricultural activities that account for a negligible consumption.

The fuel sales record maintained in NIOC is not tabulated separately as routine service of the organization for each emission sources as discussed above. Separation of fuel consumption among sources are made, on an ad hoc basis, by NIOC in response to the official request by AQCC, therefore, the disadvantage of the second level method is potential arbitrary allocation of among the emission sources. In the estimation, emissions generated from gasoline was deducted by the same token above.

D2.5 Comparability between the Estimate in 1994 and 2002

The emission estimate in this study is not comparable with that was made in the previous JICA's study in 1994 because there are differences in:

- Data availability between 1994 and 2002, thereby;
- The methods on which the estimation grounded; and
- Geographical extent of GTA territory.

The figure below schematically outlines the process adopted in the estimation in 1994. The major source of information on fuel consumption used in 1994 was the national-scale energy balance that gave the overall balance of fuel production, export, import and domestic supply at the country level. As the energy consumption data within GTA territory was not available in 1994, several assumptions were made to derive the local-scale energy balance, which includes the followings:

- Consumption pattern of solid fuel by large industries is identical between Iran and Japan;
- Consumption pattern of fuel by vehicle is identical between Iran and Japan; and

- Annual fuel consumption per company (>10 employees) is identical between that of the country and GTA regardless of industrial scale, industrial sub-sector etc.

For more detail, please refer to page 4-89 of the Supporting Report of the Study published in 1997.

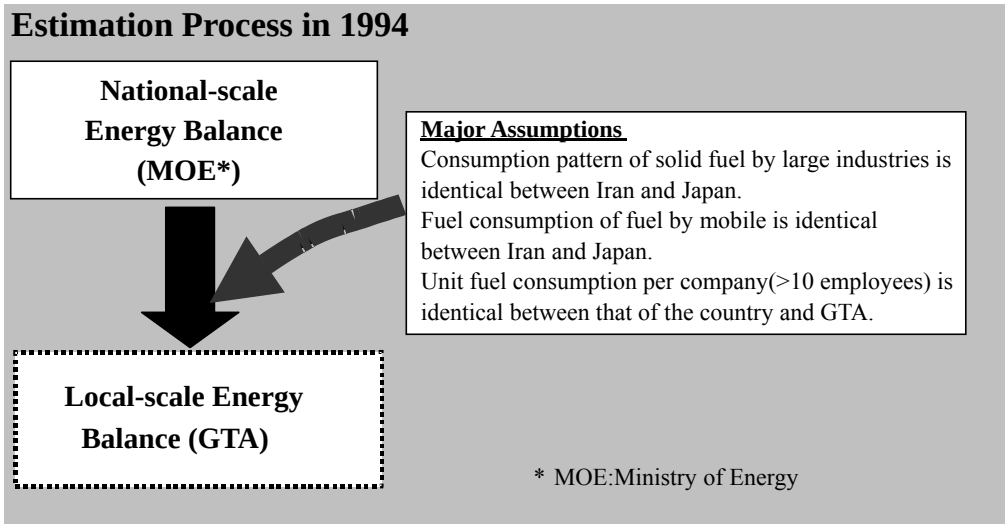


Figure D.2 Estimation Process in 1994

D2.6 Data Related to the First Level Estimate

Table D.3 Consumption of Different Fuel Types in GTA

X 1000 lit.

Year	Gasoline	Kerosene	Gas-oil	Heavy oil
1379-80	2,645,000	378,000	2,182,000	707,700
1380-81	2,733,000	328,000	2,148,000	513,300
1381-82	2,834,000	350,000	1,967,000	477,900

Source: NIOC, based on AQCC (2004) provided by Air Pollution Investigation Bureau, DoE.

Table D.4 Emission Factors for Various Fuel Types

gr/lit

Fuel	SO_2	NO_2	CO	HC	TSM
Gasoline	1.5	13.5	350	63	1.3
Gas-oil	16.8	27	7.2	22	13.2
Kerosene	3.2	4.23	0.56	0.37	1.85
Heavy oil	55	6	0.5	0.35	2.75

Source: IFCO through Air Pollution Investigation Bureau, DoE.

Table D.5 Air Pollution Estimation Based on the Aggregate Fuel Consumption and Using Emission Factors

ton/yr

Year	Fuel	SO_2	NO_2	CO	HC	TSM
1379-80	Gasoline	3,967.5	49,207.5	925,750	166,635	3,438.5
	Kerosene	129.6	1,598.9	211.68	139.86	699.3
	Gas-oil	36,657.6	29,457	15,710.4	48,004	28,802.4
	Heavy oil	38,923.5	4,246.2	353.8	247.7	1,946.2
1380-81	Gasoline	4,099.5	36,895.5	956,550	172,179	3,552.9
	Kerosene	1,049.6	1,387.4	183.68	121.36	606.8
	Gas-oil	36,086.4	57,996	154,65.6	47,256	28,353.6
	Heavy oil	28,248	3,081.6	256.6	179.7	1,411.6
1381-82	Gasoline	4,251	38,259	991,900	178,542	7,793.5
	Kerosene	1120	1,480.5	196	129.5	553
	Gas-oil	33,045.6	53,109	14,162.4	43,274	25,964.4
	Heavy oil	26,284.5	2.868	239	167.3	1,314.2

Table D.6 Pollutant Estimate by the First Level

1000 ton/year

Year	Fuel	SO_2	NO_2	CO	HC	TSM
1379-80	Kerosene	130	1,599	212	140	699
	Gas-oil	36,658	29,457	15,710	48,004	28,802
	Heavy oil	38,924	4,246	354	248	1,946
	Natural Gas	81	2,845	2,207	626	236
	Total	75,792	38,147	18,483	49,017	31,684
1380-81	Kerosene	1,049.60	1,387.40	183.68	121.36	606.8
	Gas-oil	36,086.40	57,996	154,65.6	47,256	28,353.60
	Heavy oil	28,248	3,081.60	256.6	179.7	1,411.60
	Natural Gas	82.6176	2,953.764	2,235.312	613.98	238.87
	Total	65,467	65,419	2,676	48,171	30,611
1381-82	Kerosene	1120	1,480.50	196	129.5	553
	Gas-oil	33,045.60	53,109	14,162.40	43,274	25,964.40
	Heavy oil	26,284.50	2.868	239	167.3	1,314.20
	Natural Gas	97.8624	3,433.222	2,698.392	755.58	284.834
	Total	60,548	58,026	17,296	44,326	28,116

D2.7 Data Related to the Second Level Estimate

Table D.7 Fuel Consumption of Industrial Units in GTA

Unit:lit

Year	Gasoline	Kerosene	Gas-oil	Heavy oil
1378-79	N/A	3,875,000	13,596,4000	380,470,000
1379-80	12,491,000	2,559,000	12,493,5000	312,764,000
1380-81	14,577,000	3.343,000	114,645,000	238,548,000

Source: NIOC, based on AQCC (2004) provided by Air Pollution Investigation Bureau, DoE.

Table D.8 Fuel Consumed in Domestic and Commercial Sectors in GTA

Unit:lit

Year	Gasoline	Kerosene	Gas-oil	Heavy oil
1378-79	20,712,000	323,009,000	983,504,000	24,173,000
1379-80	30,648,000	326,078,000	876,876,000	4,044,000
1380-81	29,754,000	263,787,000	876,872,000	9,730,000

Source: NIOC, based on AQCC (2004) provided by Air Pollution Investigation Bureau, DoE.

Table D.9 Fuel Consumption in Other Sectors Including Power Plants in GTA

Unit:lit

Year	Gasoline	Kerosene	Gas-oil	Heavy oil
1378-79	1,995,000	1,080,000	123,372,000	108,656,000
1379-80	2,572,000	-	150,779,000	161,062,000
1380-81	4,696,000	-	155,347,000	117,078,000

Source: NIOC, based on AQCC (2004) provided by Air Pollution Investigation Bureau, Do.

Table D.10 Air Pollutants Resulted from Consumption of Fuel in Industrial Sectors in GTA

ton/yr

Year	Fuel	SO_2	NO_2	CO	HC	TSM
1378-79	Gasoline					
	Kerosene	12.40	16.39	2.17	1.43	7.17
	Gas-oil	2,284.19	3,671.10	978.94	2,991.21	1,794.72
	Heavy oil	2,0925.85	2,282.82	190.23	133.16	1,046.29
1379-80	Gasoline	18.74	168.63	4,371.85	786.93	16.24
	Kerosene	8.19	10.82	1.43	0.95	4.73
	Gas-oil	2,098.91	3,373.24	899.53	2,748.57	1,649.14
	Heavy oil	17,202.02	1,876.58	156.38	109.47	860.10
1380-81	Gasoline	21.86	196.79	5,101.95	918.35	192.42
	Kerosene	10.70	14.14	1.87	1.24	6.18
	Gas-oil	1,926.04	3,095.41	825.44	2,522.19	1513.3
	Heavy oil	1,3120.14	1,431.29	119.27	83.49	656.01

Table D.11 Air Pollutants Resulted from Consumption of Fuel in Domestic and Commercial Sectors in GTA

ton/yr

Year	Fuel	SO_2	NO_2	CO	HC	TSM
1378-79	Gasoline	31.07	279.61	7,249.20	1,304.85	26.92
	Kerosene	746.15	1,366.32	180.88	119.51	597.57
	Gas-oil	16,522.87	26,554.61	7,081.23	21,637.09	12,982.25
	Heavy oil	1,329.51	145.04	12.08	8.46	66.47
1379-80	Gasoline	45.97	413.75	10,726.80	1,930.82	39.84
	Kerosene	1,043.45	1,379.31	182.60	120.65	603.24
	Gas-oil	14,731.51	23,675.65	6,313.51	19,291.27	11,574.76
	Heavy oil	222.42	24.26	2.02	1.41	11.12
1380-81	Gasoline	44.63	401.68	10,413.90	1,874.50	38.68
	Kerosene	844.12	1115.82	147.72	97.60	488.00
	Gas-oil	14,731.45	23,675.54	6,313.48	19,291.18	11,574.71
	Heavy oil	535.15	58.38	4.86	3.40	26.76

Table D.12 Air Pollutants Resulted from Consumption of Fuel in Other Sectors (including power plants) in GTA

ton/yr

Year	Fuel	SO_2	NO_2	CO	HC	TSM
1378-79	Gasoline	2.99	26.98	698.25	125.68	2.59
	Kerosene	3.45	4.56	0.605	0.399	1.99
	Gas-oil	2,072.65	3,331.04	888.28	2,714.18	1,628.51
	Heavy oil	5,976.08	651.94	54.33	38.03	298.80
1379-80	Gasoline	3.86	34.72	900.20	162.04	3.34
	Kerosene	-	-	-	-	-
	Gas-oil	2,533.09	4,071.03	1,085.61	3,317.14	1,990.28
	Heavy oil	8,858.41	966.37	80.53	56.37	442.92
1380-81	Gasoline	7.04	63.39	1,643.60	295.85	6.10
	Kerosene	-	-	-	-	-
	Gas-oil	2,609.83	4,194.37	1,118.50	3,417.63	2,050.59
	Heavy oil	6,439.29	702.47	58.54	40.98	321.96

Table D.13 Emission of NO_2 in 2000-02 by Stationary Source of Air Pollution

ton/yr

Year	Industrial	Domestic/ Commercial	Others	Total
1379-80	5,970.31	2,8345.58	4,014.52	38,330.41
1380-81	5,429.27	2,5492.97	5,072.12	35,994.36
1381-82	4,737.63	2,5251.42	4,960.23	34,949.28

Table D.14 Emission of HC in 2000-02 by Stationary Source of Air Pollution

ton/yr

Year	Industrial	Domestic/ Commercial	Others	Total
1379-80	3,125.8	23,069.91	2,878.29	29,074.00
1380-81	3,645.92	21,344.15	3,535.55	28,525.62
1381-82	3,525.27	21,266.68	3,754.46	28,546.41

Table D.15 Emission of SO_2 in 2000-02 by Stationary Source of Air Pollution

ton/yr

Year	Industrial	Domestic/ Commercial	Others	Total
1379-80	23,222.44	18,629.60	8,055.17	49,907.21
1380-81	19,327.86	16,043.35	19,450.53	54,821.74
1381-82	15,078.74	16,155.35	9,056.16	40,290.25

Table D.16 Emission of CO in 2000-02 by Stationary Source of Air Pollution

ton/yr

Year	Industrial	Domestic/ Commercial	Others	Total
1379-80	1,171.34	14,523.39	1,641.46	17,336.19
1380-81	5,429.19	17,224.93	2,066.34	24,720.46
1381-82	6,048.53	16,879.96	2,820.64	25,749.13

Table D.17 Emission of TSM in 2000-02 by Stationary Source of Air Pollution

ton/yr

Year	Industrial	Domestic/ Commercial	Others	Total
1379-80	2,848.18	13,673.21	1,931.89	18,453.28
1380-81	2,530.21	12,228.96	2,436.54	17,195.71
1381-82	2,367.91	12,128.15	2,378.65	16,874.71

D2.8 Data related to Natural Gas

Table D.18 Consumption of Natural Gas in Various Sectors in GTA

million m^3

Year	Industrial	Domestic/ Commercial	Others	Total
1379-80	852	6,208	1,387	8,447
1380-81	1,136	5,930	1,540	8,606
1381-82	1,062	7,496	1,636	10,194

Source: National Iranian Gas Co., through AQCC.

Table D.19 Emission Factors of Air Pollutants Emanating from Burning of Natural Gas in Various Sectors in GTA

gr/ m^3

	SO_2	NO_2	CO	HC	TSM
Domestic and commercial sources	9.6	300	270	90	29
Industrial and miscellaneous	9.6	439	237	30	25

Source: IFCO, through Air Pollution Investigation Bureau.

Table D.20 Air Pollutants Resulted from Consumption of Natural Gas in Industrial Sectors in GTA

kg/yr

Year	Pollutant	Industries	Domestic / Commercial	Others	Total
1379-80	SO_2	8,179.2	59,596.8	13,315.2	81,091.2
	NO_2	374,028.0	1,862,400.0	608,893.0	2,845,321.0
	CO	201,924.0	1,676,160.0	828,719.0	2,206,803.0
	HC	25,560.0	558,720.0	41,610.0	625,890.0
	TSM	21,300.0	180,032.0	34,675.0	236,007.0
1380-81	SO_2	10,905.6	56,928.0	14,784.0	82,617.6
	NO_2	498,704.0	1,779,000.0	676,060.0	2,953,764.0
	CO	269,232.0	1,601,100.0	364,980.0	2,235,312.0
	HC	34,080.0	533,700.0	46,200.0	613,980.0
	TSM	28,400.0	171,970.0	38,500.0	238,870.0
1381-82	SO_2	10,195.2	71,961.6	15,705.6	97,862.4
	NO_2	466,218.0	2,248,800.0	718,204.0	3,433,222.0
	CO	286,740.0	2,023,920.0	387,732.0	2,698,392.0
	HC	31,860.0	674,640.0	49,080.0	755,580.0
	TSM	26,550.0	217,384.0	40,900.0	284,834.0

Table D.21 Estimation of the Total Air Pollution Emission of Stationary Sources by Fuel Type (excluding gasoline)

kg/yr

Year	Fuel	SO_2	NO_2	CO	HC	TSM
1378-79	Nat. gas	81,091.2	2,845,321	2,206,803	625,890	236,007
	Kerosene	758,550	1,387,270	183,655	121,339	60,6730
	Gas-oil	20,879,710	33,556,750	8,948,450	27,342,480	16,405,480
	Heavy oil	28,231,440	3,079,800	256,640	179,650	1,411,560
Total		49,968,791.2	40,869,141	11,595,548	28,269,359	18,659,777
1379-80	Nat. gas	82,617.6	2,953,764	2,235,312	613,980	238,870
	Kerosene	1,051,640	1,390,130	184,030	121,600	607,970
	Gas-oil	19,363,510	31,119,920	8,298,650	25,356,980	15,214,180
	Heavy oil	18,282,850	2,867,210	238,930	167,250	1,314,140
Total		38,780,617.6	38,331,024	10,972,922	26,259,810	17,375,160
1380-81	Nat. gas	97,862.4	3,433,222	2,698,392	755,580	284,834
	Kerosene	854,820	1,129,960	149,590	98,840	494,180
	Gas-oil	19,267,320	30,965,320	8,257,420	25,231,000	15,138,600
	Heavy oil	20,094,580	2,192,140	182,670	127,870	1,004,730
Total		40,314,582.4	37,720,642	11,288,072	26,213,290	16,922,344

D3 Pollutant Emission from Mobile Sources

D3.1 Outline

The pollutant emission from mobile sources consists of the emission from vehicle and the emission from railway.

The outline of mobile source inventory, which includes the emission from vehicle and its related data, is shown in Table D.22.

The methodology and results of emission estimation of railway is described in D3.5.

Table D.22 Outline of Mobile Source Inventory

Target year	Year 2002
Target area	GTA (Grater Tehran area) shown in Figure D3.
Target pollutants	CO, NOx, SO_2, CH_4, PM_{10}, NMVOC
Target vehicles type	Passenger cars, Light trucks, Taxies, Mini buses, Full size buses, UBCT buses, Heavy trucks, Motorcycles
Target road	11,155 road links of main road

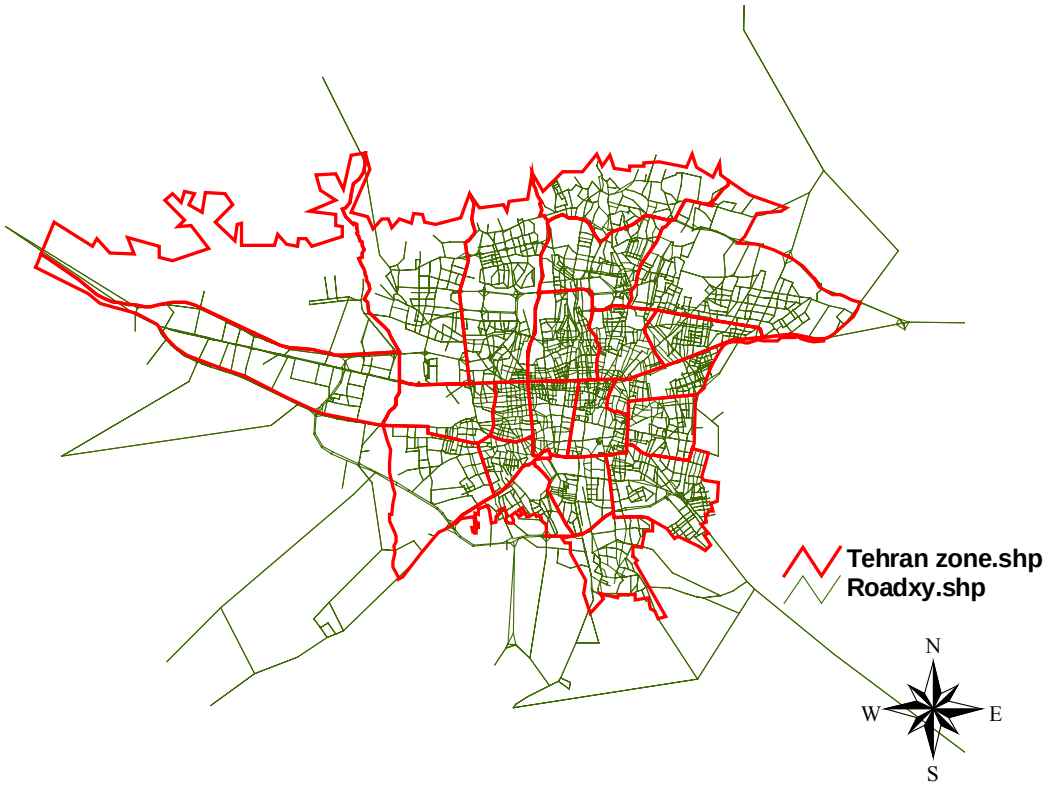


Figure D.3 Target Area

D3.2 Methodology of Vehicular Emission Estimation

(1) Outline

The mobile source inventory preparation is carried out in following steps**, i) Data collection, ii) Emission factor calculation, iii) Mobile source inventory preparation**.

At first, the required data will be collected such as traffic data, emission factor by vehicle model, vehicle registration data, emission regulation, and fuel statistics. Next, the emission factor of target year will be calculated using the emission factor by vehicle model and vehicle registration data. Finally, emission from vehicle is estimated using the traffic data and the emission factor of target year.

Then, the environmental correction factor is introduced in order to consider all emission from all roads. It is defined based on the difference of fuel consumption between the estimated one and statistics.

The outline of mobile source inventory preparation process is shown in Figure D.4.

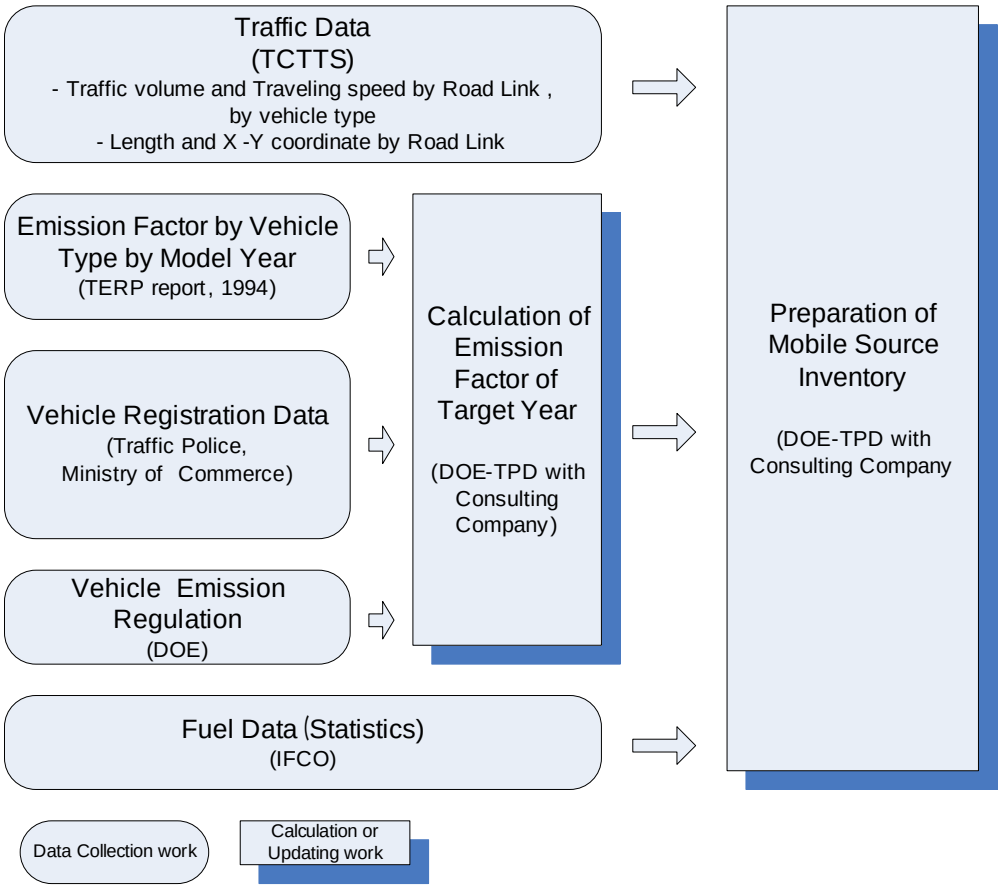


Figure D.4 Process of Mobile Source Inventory Preparation

(2) Data collection

Data and information listed in Table D.23 were collected.

Table D.23 Information for Data Source

Category	Existing Data	Data Source	Remarks
Traffic Data	Traffic volume by vehicle type by road link.	Tehran Comprehensive Transportation and Traffic Studies Co.	Originally provided in 1994. Partially updated using the camera system in 2002.
	Traveling speed by vehicle by road link		
	Road structure (X-Y coordinates, length, etc)		
Vehicle Registration Data	Total number of Vehicles registered in each city.	Traffic Police	Recorded on daily basis. No regular publication is made.
	Inventory of imported and domestically produced vehicles since 1968	Ministry of Commerce	Coverage: 1968-2003
Emission Factor	Emission factors by model of vehicle	TERP Study	1994
Fuel Data	Fuel consumption by fuel type	IFCO	Web Address: http://www.ifco.ieeo.org

Source: JICA Study Team

Traffic Data

The traffic data was prepared using software EMME2 in Tehran comprehensive Transportation and Traffic Studies Company (TCTTS).

This company carried out a very detailed study of the traffic assignment data of Tehran in 1994. The study recorded traffic volume by vehicle type in more than 11,000 links in the Greater Tehran Area. The information included also traveling speeds by vehicle type and the road structure data for each link. In conjunction with the emission factors for various types and ages of vehicles mentioned above, the traffic related emissions have been calculated. These data was used by the TERP study.

Digital copies of the original data generated in 1994 were at the possession of the Provincial DOE.

The traffic assignment data for the GTA was updated by the TCTTS Co. in 2002. The baseline information has been taken from the traffic studies done in 1994. EMME2 software has been used to work out estimations.

The information used to run the model includes network information, vehicle types, public vehicles, public transport paths, turning characteristics at weavings and trip demand matrices and functions. Model outputs have been double checked and verified by comparing the volumes estimated in the assignment process with and the volumes observed through volume counts at the counting stations as well as a comparison between the estimated numbers of travelers with the observations made at bus stations in 1994.

The baseline information (population, economic, social, road network, etc) has been updated for 2002 to make the model output valid for the same year.

In order to calculate the traffic volume in each traffic zone (zoning made by Tehran Comprehensive Transportation and Traffic Studies), all information, models and functions as well as the network information have been updated for 2002. For example, population, employment, number of students, area and number of commercial and administrative units, cinemas, parks, hotels, etc and the road network, subway system, public and private fleets, and other information have been updated for the target year.

The existing information on the traffic volume in various parts of Tehran corresponds to a morning peak hour as passenger car equivalent. This has so far been the basis for all policies and plans. In order to calculate the required parameters for various hours of the day and different seasons of the year categorized by vehicle types, modifications had to be made in model information.

Eventually, by modifying the existing model and applying different factors, traffic volume and velocity has been calculated for each part of the network by vehicle type for various hours and seasons. As a result, the following information has been generated in digital format and recorded as separate files on CD-ROM:

- Traffic volume (vehicle per hour) by vehicle type by link for a workday in November (t = 1-24);
- Table of traffic volume conversion factors for different months;
- Speed (km/h) as car equivalent (spd) and public vehicle equivalent (spdt) in hour "t" of a workday in month "m" (t = 1-24 and m = 1-12);
- Table of speed coefficient for vehicle types (excluding public transport vehicles) compared to car equivalent speed; and
- X/Y coordinates of network nodes.

Vehicle registration data

The Registration Office of Traffic Police is the only government authority with legal responsibility over the registration of vehicle ownership. Number plates of the newly produced vehicles will be provided by the Registration Office before the vehicle leaves the manufacturing company. The Registration Office has setup Registration Desks within each factory. The Registration Desks assign and attach a registration number to each vehicle. As of end March 2004, a new registration system has come into effect. This new system assigns the number to the name of the vehicle owner instead of the vehicle itself. The new system is intended to be applied to the used vehicles in a phased process. The Registration Office keeps an up-to-date inventory of the vehicles across the country. When a vehicle is put out of order for any reason, its registration number will be taken out of the system. It is worth mentioning however that few vehicles are normally scrapped in comparison with the ones coming into use each year. The number of vehicle scrapping cases in Tehran remains in an order of 2000, against some 400,000 vehicles being registered in a year.

The registration office keeps all the information in its extensive network of inter-linked stations across the country. The data are not published as public documents but are available at “Naja Rahvar” Office upon official request.

(3) Emission Factor Calculation

The emission factor is estimated in following steps**, i) Calculation of Total Number of Vehicles by Model up to Target Year, ii) Calculation of Ratio of Vehicles by Model up to Target Year, iii) Calculation of Vehicular Emission Factor in Target Year.**

The process of emission factor estimation is shown in Figure D.5.

The emission factor by vehicle type is calculated using the percentage of vehicle number by model and the emission factor by model.

At first, the total number of registered vehicle by model by year is calculated. Then the registration data of old cars up to 1995 is applied and the registration data of new produced cars by year from 1996 also is used. Based on the total number of registered vehicles, the percentage of vehicle number by model is calculated.

Next, the emission factor by model is calculated. The emission factor of old-fashioned vehicles was established in GEF TERP Study with the chassis dynamometer. But the emission factor of new produced car regulated by ECE R-8303 is not available. So, using the reduction rate of emission regulation from ECE R8301 to ECE R8303, the emission factor of ECE R8303 is calculated. The ECE R8301 emission factor was established in GEF TERP report.

This approach using reduction rate is based on the method of latest European emission factor model (COPERT3).

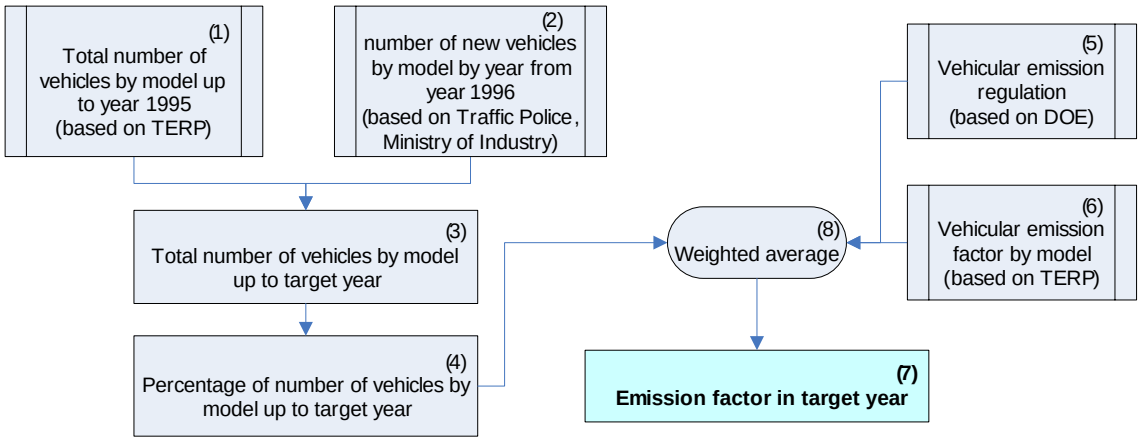


Figure D.5 Process of Emission Factor Estimation

STEP1: Calculation of Total Number of Vehicles by Model up to Target Year (3) : $\mathbf{TotalNum_{ModelA,uptoTarget\ Year}}$

Ex) $TotalNum_{ModelA,\ uptoTarget\ Year} = TotalNum_{ModelA,upto1995} + NewRegNum_{ModelA,1996} + NewRegNum_{ModelA,1997} + \cdots + NewRegNum_{ModelA,Target\ Year}$

$TotalNum_{ModelA,upto1995}$: Total number of vehicles by model up to year 1995 (1) (based on TERP report)

$NewRegNum_{ModelA,year}$: Number of new vehicles by model by year from year 1996 (2) (based on information from Ministry of Industry, NAJA)

STEP2: Calculation of Ratio of Vehicles by Model up to Target Year (4) :
$Ratio_{ModelA,uptoTarget\ Year}$
Ex) $Ratio_{ModelA,uptoTarget\ Year} = TotalNum_{ModelA,\ uptoTarget\ Year}$ /
($TotalNum_{ModelA,\ uptoTarget\ Year} + TotalNum_{ModelB,\ uptoTarget\ Year} + \cdots + TotalNum_{ModelX,\ uptoTarget\ Year}$)

STEP3: Calculation of Vehicular Emission Factor in Target Year (7) : $EF_{Target\ Year}$
Ex) $EF_{Target\ Year} = EF_{ModelA} \times Ratio_{ModelA,uptoTarget\ Year} + EF_{ModelB} \times Ratio_{ModelB,uptoTarget\ Year} + \cdots + EF_{ModelX} \times Ratio_{ModelX,uptoTarget\ Year}$ (Weighted Average Calculation)

EF_{ModelA} : Vehicular emission factor by model in target year(6) (based on TERP report) Vehicular emission regulation(5) (based on DOE) shall be referred in selection of vehicular emission factor suitable to the model of vehicle.

Table D.24 Vehicles Model in Categories

Category	Vehicle Model
Passenger Cars	• Paykan (Produced before 1996) • ECE 15.03 • ECE 1504 • Other Iranian Produced • ECE 8301 • ECE 8303 • Imported vehicles of old years • Converted LPG vehicles
Light duty trucks (Vannets)	• No Regulation • ECE 1503 • ECE 1504 • ECE R8301 • ECE R8303
Taxies	• Converted LPG vehicles • Converted CNG Vehicle • ECE 15.04
Mini Buses	• Mercedes Benz & Similar Technology • Fiat & Similar Technology • IVECO & Similar Technology
Full size Buses	• Turbo charged • Natural Aspirated
UBCT Buses	• Turbo charged • Natural Aspirated • Converted LPG/CNG buses
Heavy duty trucks	• Turbo charged • Natural Aspirated
Motor cycles	• 4-strokes • 2-strokes • Mopeds

Source: JICA Study Team

For Example : Emission Factor of Passenger Car in year 2002

CO Emission Factor (ECE Driving mode, Horizontal, Year 2002)=

CO EF of 'PAYKAN 1996'× Ratio of 'PAYKAN until 2002'

＋ CO EF of 'Other Iranian produced 1996' × Ratio of 'Other Iranian produced until 2002 '

＋ CO EF of 'ECER1503' × Ratio of 'ECER1503 until 2002 '

＋ CO EF of 'ECER1504' × Ratio of 'ECER1504 until 2002 '

＋ CO EF of 'Old IMPORTED 1996' × Ratio of 'Old IMPORTED until 2002 '

＋ CO EF of 'ECER8301' × Ratio of 'ECER8301 until 2002 '

＋ CO EF of 'ECER8303' × Ratio of 'ECER8303 until 2002 '

＋ CO EF of 'LPG 1996' × Ratio of 'LPG until 2002 '

= 77000 *0.2538 + 42200*0.1134 + 27761*0.4501 + 18151*0.0 + 76300*0.081 + 3059*0.0335 + 2386*0.0508 + 40000*0.0173

= 43919mg/km

Table D.25 Total Number of Vehicles by Model up to Target Year (3)

Unit: vehicles/year

	Paykan (before1995)	Other Iranian Produced (before 1995)	ECE R1503	ECE R1504	Old Imported	ECE R8301	ECE R8303	LPG	Total
1995	366,600	163,800	-	-	117,000	-	-	25,049	672,449
1996	366,600	163,800	63,287	-	117,000	60	620	25,049	736,416
1997	366,600	163,800	139,140	-	117,000	606	2,189	25,049	814,384
1998	366,600	163,800	216,730	-	117,000	2,767	3,840	25,049	895,785
1999	366,600	163,800	295,846	-	117,000	7,358	6,846	25,049	982,499
2000	366,600	163,800	391,282	-	117,000	12,381	13,951	25,049	1,090,063
2001	366,600	163,800	486,578	-	117,000	16,862	29,854	25,049	1,205,743
2002	366,600	163,800	650,090	-	117,000	48,379	73,399	25,049	1,444,317
2003	366,600	163,800	650,118	204,754	117,000	119,875	125,371	25,049	1,772,567

Source: JICA Study Team

Table D.26 Ratio of Vehicles by Model up to Target Year (4)

Unit: %

	Paykan (before1995)	Other Iranian Produced (before 1995)	ECE R1503	ECE R1504	Old Imported	ECE R8301	ECE R8303	LPG	Total
1995	54.52%	24.36%	0.00%	0.00%	17.40%	0.00%	0.00%	3.73%	100.00%
1996	49.78%	22.24%	8.59%	0.00%	15.89%	0.01%	0.08%	3.40%	100.00%
1997	45.02%	20.11%	17.09%	0.00%	14.37%	0.07%	0.27%	3.08%	100.00%
1998	40.92%	18.29%	24.19%	0.00%	13.06%	0.31%	0.43%	2.80%	100.00%
1999	37.31%	16.67%	30.11%	0.00%	11.91%	0.75%	0.70%	2.55%	100.00%
2000	33.63%	15.03%	35.90%	0.00%	10.73%	1.14%	1.28%	2.30%	100.00%
2001	30.40%	13.58%	40.36%	0.00%	9.70%	1.40%	2.48%	2.08%	100.00%
2002	25.38%	11.34%	45.01%	0.00%	8.10%	3.35%	5.08%	1.73%	100.00%
2003	20.68%	9.24%	36.68%	11.55%	6.60%	6.76%	7.07%	1.41%	100.00%

Table D.27 Emission Factor of Paykan

Unit:mg/km

Paykan									
		CH4	NOx	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	600	830	77000	13	339	6000	6600	0.140
	Up-hill	965	2302	217140	19	1695	9618	10583	0.194
	Down-hill	600	830	65450	11	339	6000	6600	0.119
AV.40 Km/h	Horizontal	350	1900	49000	10	263	3450	3800	0.109
	Up-hill	473	5127	60672	15	1313	4590	5063	0.152
	Down-hill	235	1140	35916	8	263	3219	3454	0.087
AV.60 Km/h	Horizontal	250	2500	36000	8	219	2470	2720	0.087
	Up-hill	324	7869	39600	12	1095	3152	3476	0.122
	Down-hill	108	1250	16353	6	219	1678	1786	0.066
AV.80 Km/h	Horizontal	220	3300	32000	9	228	2170	2390	0.091
	Up-hill	279	8100	33600	12	1140	2754	3033	0.127
	Down-hill	131	1650	24000	6	228	1552	1683	0.060

Table D.28 Emission Factor of Other Iranian Produced Vehicles

Unit:mg/km

OTHER IRANIAN PRODUCED VEHICLE									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	450	1000	42200	12	248	4450	4900	0.122
	Up-hill	724	2774	119004	16	1238	7133	7857	0.163
	Down-hill	450	1000	35870	10	248	4450	4900	0.100
AV.40 Km/h	Horizontal	260	1580	26900	8	192	2570	2830	0.087
	Up-hill	351	4264	33308	12	960	3419	3770	0.121
	Down-hill	175	948	19717	7	192	2398	2573	0.070
AV.60 Km/h	Horizontal	180	2000	19900	7	188	1840	2020	0.075
	Up-hill	233	6295	21890	10	940	2348	2581	0.105
	Down-hill	78	1000	9040	5	188	1250	1328	0.056
AV.80 Km/h	Horizontal	160	2700	18000	7	167	1620	1780	0.075
	Up-hill	203	6627	18900	10	833	2056	2259	0.104
	Down-hill	95	1350	13500	5	167	1159	1254	0.049

Table D.29 Emission Factor of ECE 1503

Unit:mg/km

ECE 1503									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	322	1552	27761	12	248	3182	3500	0.1220
	Up-hill	518	4306	78285	16	1238	5100	5610	0.1630
	Down-hill	322	1552	30490	10	248	3182	3500	0.1000
AV.40 Km/h	Horizontal	187	1917	16752	8	192	1849	2034	0.0870
	Up-hill	253	5173	20743	12	960	2460	2706	0.1210
	Down-hill	126	1150	12279	7	192	1725	1898	0.0700
AV.60 Km/h	Horizontal	135	2336	10692	7	188	1384	1523	0.0750
	Up-hill	175	7354	24079	10	940	1766	1943	0.1050
	Down-hill	59	1168	4107	5	188	940	1034	0.0560
AV.80 Km/h	Horizontal	99	2848	7648	7	167	1006	1107	0.0750
	Up-hill	126	6990	8030	10	833	1277	1404	0.1040
	Down-hill	59	1424	5736	5	167	720	792	0.049

Table D.30 Emission Factor of ECE 1504

Unit:mg/km

ECE 1504									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	254	1753	18151	12	248	2507	2761	0.122
	Up-hill	408	4863	51187	16	1238	4019	4427	0.163
	Down-hill	254	1753	15429	10	248	2507	2761	0.100
AV.40 Km/h	Horizontal	150	2122	9087	8	192	1480	1630	0.087
	Up-hill	202	5728	11251	12	960	1969	2171	0.121
	Down-hill	101	1273	6660	7	192	1381	1482	0.070
AV.60 Km/h	Horizontal	109	2530	6283	7	188	1118	1227	0.075
	Up-hill	142	7964	6911	10	940	1426	1568	0.105
	Down-hill	47	1265	2854	5	188	759	807	0.056
AV.80 Km/h	Horizontal	78	2998	4502	7	167	794	872	0.075
	Up-hill	99	7357	4727	10	833	1007	1107	0.104
	Down-hill	47	1499	3376	5	167	568	614	0.049

Table D.31 Emission Factor of Old Imported Vehicles

Unit:mg/km

Imported Vehicles of Older Model Years									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	540	1200	76300	16	540	5400	5940	0.1670
	Up-hill	869	3328	215166	22	2700	8656	9525	0.2320
	Down-hill	540	1200	64855	14	540	5400	5940	0.1420
AV.40 Km/h	Horizontal	310	1640	48700	12	418	3110	3420	0.1290
	Up-hill	419	4426	60301	17	2090	4137	4556	0.1800
	Down-hill	208	984	35696	10	418	2902	3110	0.1030
AV.60 Km/h	Horizontal	220	2200	36100	10	350	2230	2450	0.1050
	Up-hill	285	6925	39710	14	1750	2846	3131	0.1470
	Down-hill	95	1100	16399	8	350	1515	1610	0.0790
AV.80 Km/h	Horizontal	200	2860	32500	11	364	1960	2160	0.1100
	Up-hill	254	7020	34125	15	1820	2488	2742	0.1530
	Down-hill	119	1430	24375	7	364	1402	1521	0.0730

Table D.32 Emission Factor of ECE R8301

Unit:mg/km

Passenger vehicles,fullfilling ECE R-83 app B(EURO 1)									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	60	440	3059	4	8	649	709	0.1330
	Up-hill	88	550	7019	5	39	811	899	0.1850
	Down-hill	55	187	2112	3	8	506	561	0.1330
AV.40 Km/h	Horizontal	7	44	110	4	2	51	58	0.0980
	Up-hill	9	119	136	6	11	67	76	0.1360
	Down-hill	4	22	81	5	2	47	51	0.0780
AV.60 Km/h	Horizontal	6	44	55	4	2	33	39	0.0700
	Up-hill	7	138	50	6	11	42	49	0.0980
	Down-hill	2	8	25	3	2	22	24	0.0530
AV.80 Km/h	Horizontal	6	33	55	4	2	22	28	0.0730
	Up-hill	7	81	54	6	11	28	35	0.1010
	Down-hill	3	6	60	3	2	16	19	0.0480

Table D.33 Emission Factor of ECE R8303

Unit:mg/km

Passenger vehicles,fullfilling ECE R-83 app B(EURO 2)									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	43	220	2386	4	8	649	692	0.1330
	Up-hill	62	275	5475	5	39	811	873	0.1850
	Down-hill	39	94	1647	3	8	506	545	0.1330
AV.40 Km/h	Horizontal	5	22	86	4	2	51	56	0.0980
	Up-hill	6	60	106	6	11	67	73	0.1360
	Down-hill	3	11	63	5	2	47	50	0.0780
AV.60 Km/h	Horizontal	4	22	43	4	2	33	37	0.0700
	Up-hill	5	69	39	6	11	42	47	0.0980
	Down-hill	1	4	20	3	2	22	23	0.0530
AV.80 Km/h	Horizontal	4	17	43	4	2	22	26	0.0730
	Up-hill	5	41	42	6	11	28	33	0.1010
	Down-hill	2	3	47	3	2	16	18	0.0480

Table D.34 Emission Factor of LPG

Unit:mg/km

LPG converted passenger cars without cat.conv.									
		CH4	Nox	CO	SO2	PM10	NMVOC	THC	FC
ECE driving	Horizontal	192	2460	40000	6	21	1924	2116	0.1330
	Up-hill	496	6823	60000	9	105	3085	3581	0.1850
	Down-hill	192	2214	24744	7	21	1924	2116	0.1330
AV.40 Km/h	Horizontal	140	1796	12472	5	6	1405	1545	0.0980
	Up-hill	253	4846	15443	6	30	1869	2122	0.1360
	Down-hill	88	1077	9142	4	6	1311	1399	0.0780
AV.60 Km/h	Horizontal	101	1683	8992	3	6	1013	1114	0.0700
	Up-hill	131	5298	8225	5	30	1292	1423	0.0980
	Down-hill	44	842	4085	2	6	688	732	0.0530
AV.80 Km/h	Horizontal	105	1739	9292	3	6	1047	1152	0.0730
	Up-hill	133	4269	9082	5	30	1328	1461	0.1010
	Down-hill	62	870	10098	2	6	749	811	0.0480

Table D.35 Emission Factor of Passenger Cars in 2002

Unit:mg/km

LDV 2002								
		CH4	NOx	CO	SO2	PM10	NMVOC	THC
ECE driving	Horizontal	399	1188	43919	12	271	3985	4383
	Up-hill	645	3257	122820	16	1352	6368	7010
	Down-hill	399	1169	40238	10	271	3973	4370
AV.40 Km/h	Horizontal	231	1691	27195	8	209	2280	2509
	Up-hill	312	4562	33673	13	1045	3033	3342
	Down-hill	155	1014	19934	7	209	2127	2303
AV.60 Km/h	Horizontal	165	2123	19290	7	190	1659	1826
	Up-hill	213	6682	26733	10	951	2118	2332
	Down-hill	71	1061	8425	5	190	1127	1215
AV.80 Km/h	Horizontal	137	2689	16402	8	182	1366	1504
	Up-hill	174	6601	17211	10	908	1734	1908
	Down-hill	81	1344	12357	5	182	977	1064

(4) Inventory Preparation

The inventory preparation is carried out in following steps, **i) Estimation of fuel consumption, ii) Calculation of environmental correction factor, iii) Estimation of air pollutants emission, iv) Building Database in Arcview.**

The process of Inventory preparation is shown in Figure D.6.

STEP1: Estimation of fuel consumption by road link, by vehicle type using traffic volume, traveling speed, road length and fuel efficiency by vehicle type.
STEP2: Calculation of environmental correction factor in comparison between estimated fuel consumption and fuel consumption statistics.
STEP3: Estimation of air pollutants emission by road link, by vehicle type using traffic volume, traveling speed, road length and emission factor by vehicle type, correction factor.

The following formulas are used to calculate the pollutants emission from the vehicles.

EA=EF*N*Kt*TV,
Where,

Kt (km/vehicle):	Distance run by the vehicle
EA (kg):	Pollution emission
EF (kg/km):	Emission factor from vehicles
TV:	Traffic Volume in a certain trip
N:	Number of vehicle in each street

STEP4: Building Database in Arcview

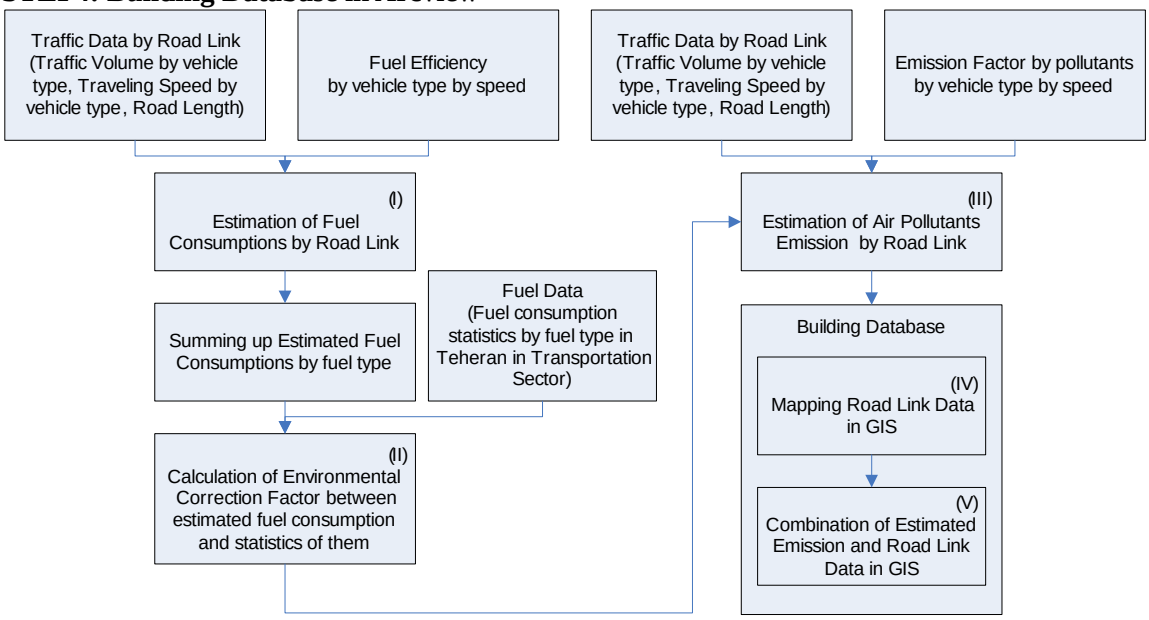
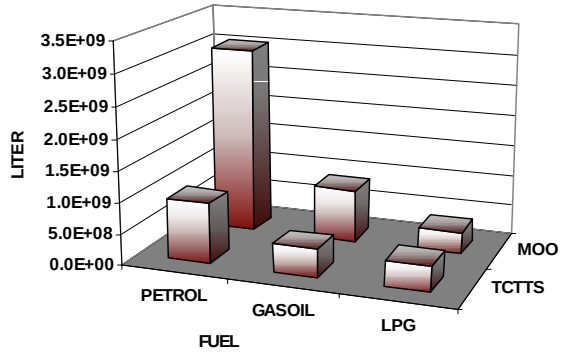


Figure D.6 Process of Inventory Preparation

The environmental correction factor was used in order to estimate the total emission from the

roads. The Traffic data covers only main roads. The emission from small roads should be considered. Because the length of all roads in Tehran is over 2 times of main roads.

The fuel consumption estimated by traffic data was compared with the fuel statistics data (shown in FigureD.7). Based on the difference of them, the environmental correction factor was defined.



Source: JICA Study Team

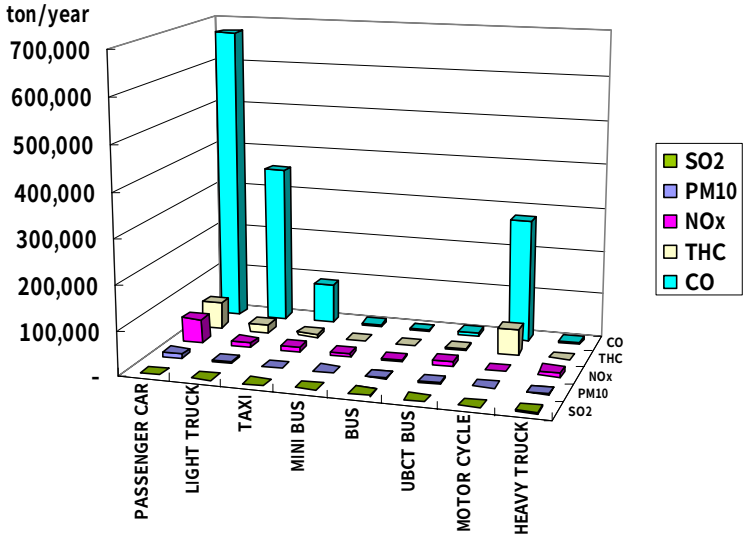
Figure D.7 Comparison between Fuel Consumption and The Fuel Statistics

D3.3 Results of Vehicular Emission Estimation

Figure D.8 and TableD.36 shows the share of vehicular emission in year 2002.

CO emission, which is estimated to be about 1.4 million ton in year 2002, is dominant in total emission from vehicle.

Main sources of CO emission are passenger cars, light truck, and motorcycle.



Source: JICA Study Team

Figure D.8 Emission by Vehicle Type by Pollutants in Year 2002

Table D.36 Emission by Vehicle Type by Pollutants in Year 2002

Unit:ton/year

Parameter	PASSENGER CAR	LIGHT TRUCK	TAXI	MINI BUS	BUS	UBCT BUS	MOTOR CYCLE	HEAVY TRUCK	TOTAL
CO	673,501	357,573	91,852	5,068	2,461	7,408	276,563	4,900	1,419,327
NOx	54,881	9,994	10,323	6,596	3,931	10,597	628	10,067	107,016
PM10	8,841	2,621	140	2,031	656	1,887	1,971	1,289	19,435
SO2	218	67	19	2,422	1,321	306	62	2,620	7,035
THC	60,220	17,830	7,300	2,135	1,196	3,845	60,270	2,185	154,981

Source: JICA Study Team

D3.4 Emission Factor by Vehicle Type

Table D.37 Emission Factors for Passenger Cars in 2002

Unit: mg/km

Status		CH4	NOx	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	399	1,188	43,919	12	271	3,985	4,383
	Up-hill	645	3,257	122,820	16	1,352	6,368	7,010
	Down-hill	399	1,169	40,238	10	271	3,973	4,370
AV.40 Km/h	Horizontal	231	1,691	27,195	8	209	2,280	2,509
	Up-hill	312	4,562	33,673	13	1,045	3,033	3,342
	Down-hill	155	1,014	19,934	7	209	2,127	2,303
AV.60 Km/h	Horizontal	165	2,123	19,290	7	190	1,659	1,826
	Up-hill	213	6,682	26,733	10	951	2,118	2,332
	Down-hill	71	1,061	8,425	5	190	1,127	1,215
AV.80 Km/h	Horizontal	137	2,689	16,402	8	182	1,366	1,504
	Up-hill	174	6,601	17,211	10	908	1,734	1,908
	Down-hill	81	1,344	12,357	5	182	977	1,064

Table D.38 Emission Factors for Light Duty Trucks in 2002

Unit: mg/km

Status		CH4	NOx	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	635	2,108	107,461	15	464	6,346	6,980
	Up-hill	1,021	5,792	302,911	21	2,319	10,154	11,173
	Down-hill	634	2,087	92,931	13	464	6,334	6,968
AV.40 Km/h	Horizontal	364	1,981	100,048	12	359	3,637	4,001
	Up-hill	492	5,346	123,880	17	1,796	4,839	5,329
	Down-hill	245	1,188	73,333	9	359	3,394	3,650
AV.60 Km/h	Horizontal	261	1,772	49,996	9	289	2,620	2,883
	Up-hill	339	5,579	57,904	13	1,444	3,344	3,683
	Down-hill	113	885	22,534	7	289	1,781	1,903
AV.80 Km/h	Horizontal	224	2,256	44,541	11	332	2,246	2,471
	Up-hill	285	5,538	46,767	15	1,662	2,851	3,137
	Down-hill	134	1,127	33,407	7	332	1,607	1,744

Table D.39 Emission Factors for Taxies in 2002

Unit: mg/km

Status		CH4	Nox	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	196	2,430	39,600	6	28	1,965	2161
	Up-hill	497	6,741	60,597	9	142	3,151	3,647
	Down-hill	196	2,192	24,932	7	28	1,965	2,161
AV.40 Km/h	Horizontal	142	1,800	12,612	5	12	1,419	1,561
	Up-hill	253	4,857	15,616	6	60	1,888	2,141
	Down-hill	89	1,079	9,244	4	12	1,325	1,415
AV.60 Km/h	Horizontal	102	1,704	9,047	3	12	1,025	1,127
	Up-hill	132	5,365	8,743	5	60	1,307	1,440
	Down-hill	44	853	4,086	2	12	696	742
AV.80 Km/h	Horizontal	105	1,775	9,238	3	11	1,046	1,151
	Up-hill	133	4,358	9,048	5	56	1,326	1,459
	Down-hill	62	888	9,956	2	11	748	810

Table D.40 Emission Factors for Mini Buses in 2002

Unit: mg/km

Status		CH4	NOx	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	83	8,354	6,152	3,992	2,810	2,755	2,838
	Up-hill	138	17,975	13,544	6,618	4,470	4,605	4,743
	Down-hill	51	4,955	4,006	2,232	1,299	1,708	1,760
AV.40 Km/h	Horizontal	53	4,428	3,663	2,063	1,733	1,759	1,812
	Up-hill	89	9,865	8,108	3,420	2,712	2,963	3,052
	Down-hill	33	2,630	2,411	1,154	812	1,104	1,137
AV.60 Km/h	Horizontal	31	3,056	1,874	2,027	1,978	1,055	1,087
	Up-hill	53	6,141	4,030	3,254	2,982	1,752	1,805
	Down-hill	21	1,909	1,284	1,200	1,007	693	713
AV.80 Km/h	Horizontal	28	2,912	1,278	4,159	2,851	938	966
	Up-hill	43	5,281	2,411	6,239	4,163	1,422	1,464
	Down-hill	19	1,917	912	2,624	1,432	644	663

Table D.41 Emission Factors for Heavy Duty Trucks in 2002

Unit: mg/km

Status		CH4	Nox	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	203	28,908	15,430	10,152	4,351	6,747	6,949
	Up-hill	289	66,989	32,647	17,574	6,719	9,638	9,927
	Down-hill	98	16,144	8,110	5,072	2,058	3,249	3,347
AV.40 Km/h	Horizontal	166	13,665	8,093	5,736	2,782	5,518	5,683
	Up-hill	310	66,022	17,300	9,850	4,373	10,328	10,638
	Down-hill	50	5,185	4,242	2,873	1,298	1,667	1,717
AV.60 Km/h	Horizontal	98	13,310	4,197	4,782	2,222	3,269	3,367
	Up-hill	177	58,208	8,305	7,788	3,385	5,899	6,076
	Down-hill	32	5,391	2,347	2,565	1,124	1,065	1,097
AV.80 Km/h	Horizontal	72	15,335	2,151	5,012	2,328	2,401	2,472
	Up-hill	139	62,762	3,876	8,030	3,314	4,654	4,794
	Down-hill	26	6,570	1,287	2,882	1,271	869	895

Table D.42 Emission Factors for Full Size Buses in 2002

Unit: mg/km

Status		CH4	NOx	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	173	22,518	12,687	8,941	3,971	5,782	5,956
	Up-hill	248	49,707	29,174	16,771	6,386	8,260	8,508
	Down-hill	85	11,145	6,513	4,356	1,273	2,830	2,916
Km/h	Horizontal	173	9,301	7,907	4,360	2,279	5,782	5,956
	Up-hill	248	20,532	18,181	8,179	3,618	8,260	8,508
	Down-hill	85	4,603	4,059	2,124	777	2,830	2,916
AV.60 Km/h	Horizontal	104	9,790	4,046	3,755	2,188	3,469	3,573
	Up-hill	144	19,965	8,554	6,612	3,325	4,782	4,926
	Down-hill	54	5,196	2,220	1,965	813	1,824	1,879
AV.80 Km/h	Horizontal	87	10,769	1,655	3,879	2,248	2,891	2,978
	Up-hill	149	21,720	3,160	7,058	3,889	3,644	3,793
	Down-hill	49	6,129	971	2,182	924	1,632	1,681

Table D.43 Emission Factors for UBCT Buses in 2002

Unit: mg/km

Status		CH4	NOx	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	1,080	18,852	14,055	596	4,084	6,839	7,919
	Up-hill	1,700	44,545	29,233	1,003	6,006	9,777	11,478
	Down-hill	1,058	11,127	7,641	301	1,888	3,300	4,358
AV.40 Km/h	Horizontal	734	8,601	8,879	291	2,695	6,822	7,555
	Up-hill	1,007	20,556	18,081	489	3,947	9,743	10,750
	Down-hill	454	4,921	4,752	147	1,271	3,270	3,724
AV.60 Km/h	Horizontal	832	10,724	4,622	250	2,511	4,112	4,944
	Up-hill	1,088	26,091	8,645	400	3,561	5,666	6,754
	Down-hill	370	6,123	2,584	135	1,270	2,116	2,486
AV.80 Km/h	Horizontal	835	11,625	1,973	259	2,567	3,434	4,270
	Up-hill	1,075	24,774	3,368	401	3,651	4,522	5,597
	Down-hill	493	6,942	1,267	150	1,398	1,906	2,399

Table D.44 Emission Factors for Motor Cycle in 2002

Unit: mg/km

Status		CH4	NOx	CO	SO_2	PM_{10}	NMVOC	THC
ECE driving	Horizontal	298	63	24,972	10	297	9,466	9,764
	Up-hill	1,131	237	94,957	14	597	14,777	15,908
	Down-hill	190	43	15,982	8	195	3,847	4,037
AV.40 Km/h	Horizontal	149	63	42,048	7	219	5,222	5,371
	Up-hill	402	141	80,088	10	428	14,377	14,779
	Down-hill	210	40	43,014	7	197	11,288	11,498
AV.60 Km/h	Horizontal	152	73	24,972	7	198	4,627	4,779
	Up-hill	602	291	41,445	10	389	16,531	17,133
	Down-hill	98	46	7,949	6	198	7,905	8,002
AV.80 Km/h	Horizontal	125	94	9,120	8	203	4,414	4,539
	Up-hill	497	206	47,226	10	398	10,772	11,269
	Down-hill	107	74	29,152	7	272	12,513	12,619

D3.5 Emission from Railway

The following formula was used to calculate the emission from railway.

E=Ef * V

Where,

E: Emission from locomotive
Ef: Locomotive emission factor
V: Fuel consumption

The following chart shows the process of emission estimation from railway.

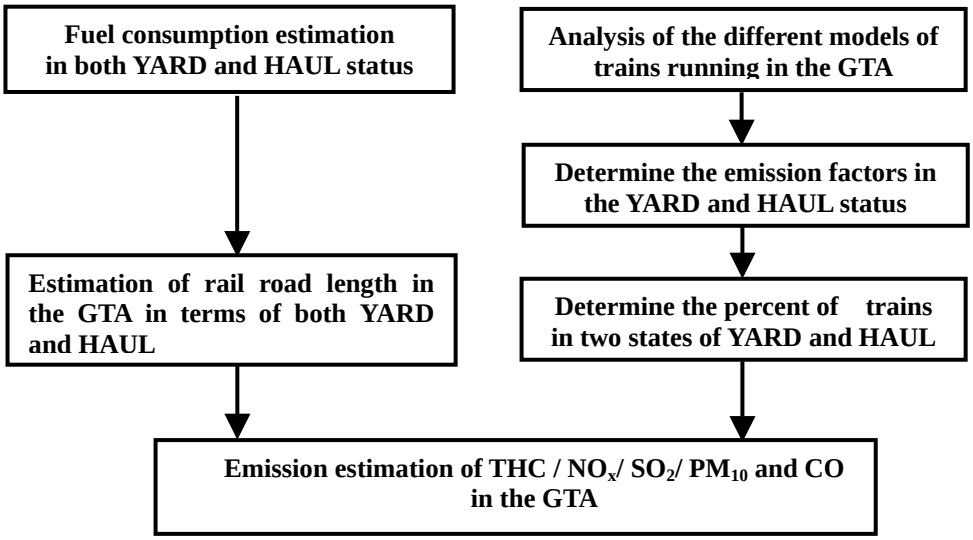


Figure D.9 Process of Emission Estimation from Railway

The emission factors of trains by model and status should be determined to estimate the emissions from trains in the GTA. For this purpose, all the models of locomotives running in the GTA were analyzed. The percentage of train status, which is HAUL and YARD, were determined.

The HAUL status is a case in which the trains carry passengers and the loads. However, in YARD status, the trains move for different purposes in the yard including repair, transporting loads from one point to the other and any other kind of activities except the HAUL activities. Even if the trains remain still in YARD status, their motors are in the idle position, so it is clear that they produce pollutions.

Using the fuel consumption data in HAUL and YARD status, the average fuel consumption can be calculated in each railroad length. Finally, the emission factor by trains in the GTA can be calculated through using the fuel efficiency and the emission factors.

The emission from railway in year 2002 is shown in Figure D.10.

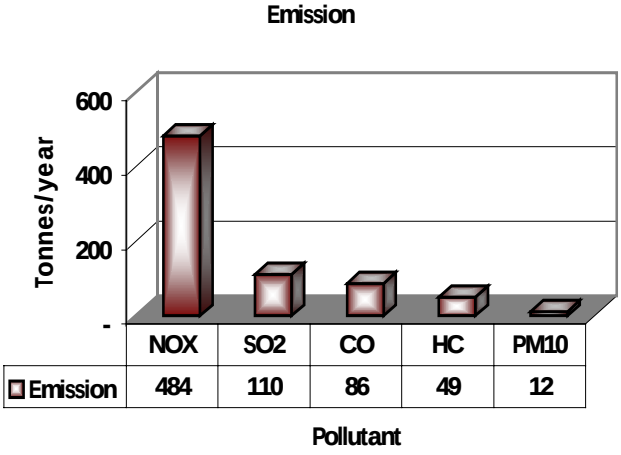


Figure D.10 Emission from Railway by Pollutants in Year 2002

D3.6 Comparison between the Estimate in 1994 and 2002

CO, HC and NOx emissions of year 2002 increased to 1.7, 1.9 and 2.7 times of ones of year 1994 respectively. On the other hand, SOx emission of year 2002 is almost same as one of year 1994.

The growth rate of HC, CO and NOx emission is less than the growth rate of the registered number of vehicles. It is supposed to be caused by the enforcement of vehicular emission regulation from 1995.

Table D.45 Comparison between the Estimate in Year 1994 and 2002

Unit:1000 tons/year

Source	SO_X	NO_X	CO	HC
Mobile Emission in year 1994	8	40	827	82
Mobile Emission in year 2002	8	107	1,419	155

Source: mobile emission in year 1994: last JICA Study
mobile emission in year 2002: JICA Study

Appendix E Iranian Stack Emission Standards

Table E.1 Iranian Stack Emission Standards

Industry	Plant	Gaseous emissions				Particulates			Turbidity (%)	
		Parameters	Primary	Secondary	Unit	Primary	Secondary	Unit	Primary	Secondary
Refineries	Catalytic reduction	CO	0.1	0.1	ppm	150	350	mg/m^3	30	30
Indirect heat transfer systems	Power plants Refineries	SO_2	800	800	ppm	150	350	mg/m^3	20	20
		CO	150	150	ppm					
		NOX	350	350	ppm					
Steel mills	Coke production	H_2S	180	360	ppm	100	250	mg/m^3	20	
	Sieving, crushing, clodding					100	250	mg/m^3		
	Blast furnace	CO	435	435	ppm	100	250	mg/m^3		
	Basic oxygen process	CO	435	435	ppm	50	150	mg/m^3		
	Open heart process					100	300	mg/m^3		
	Electric-arc furnace	CO	435	435	ppm	100	150	mg/m^3		
Bessemer process	Conversion of pig iron to steel					50	150	mg/m^3		
Primary copper smelting	Copper dryers					50	150	mg/m^3	20	
	Melting furnaces, roasters, copper converters	SO_2	800	800	ppm				20	
Primary zinc smelting	Zinc roasting unit	SO_2	800	800	ppm				20	
	Clodding unit					50	150	mg/m^3	20	
Primary aluminum reduction	Site of electrolyte vessels anode production unit	F_2	6.4	16	ppm	75	150	mg/m^3	20	20

Industry	Plant	Gaseous emissions				Particulates			Turbidity (%)	
		Parameters	Primary	Secondary	Unit	Primary	Secondary	Unit	Primary	Secondary
Electric arc for iron alloys with supported electrodes in one base	Silicon metal, ferro silicon alloy, calcium silicon or silico mangannese, zirconium alloys	CO	3.5		Vol% (Max. 500 ppm)	0.45	1	6	20	20
	Silico-manganese alloys, silver and iron alloys, ferro-chromium with high carbon cintent.	CO	3.5			0.23	0.5	6	20	20
	Charch Chromium, ferro-manganese standard, ferro-manganese silico-carbide	CO	3.5			0.23	0.5	6	20	20
Ferro-brass Bullion production	Rourber furnace, electrical and tall concave furnace					50	100	mg/m^3	20	

Industry	Plant	Gaseous emissions				Particulates			Turbidity (%)	
		Parameters	Primary	Secondary	Unit	Primary	Secondary	Unit	Primary	Secondary
Primary lead smelting	Blast furnace, Rourber furnace clodding machine					50	150	mg/m^3	20	
	Clodding machine, electrical melting furnace or convector	SO_2	800	800	ppm				20	
Pulp factory processing sulfate in cellulose preparation	Pulp making	SO_2	4.5	15	Kg/ton of product					
	Fuel burning					150	250	mg/m^3		
Sulfur production		SO_2	800	1000	ppm					
		H_2S	20	30	ppm					
		NH_3	50	100	ppm					
Ammonia production	Ammonia unit	NH_3	50	100	ppm					
Carbon Black	Wet gas filter					60	60	mg/m^3		
	Washing tower					50	50	mg/m^3		
	After heater					40	40	mg/m^3		
	Burners, heaters, furnaces					50	50	mg/m^3		
Brick and clay products	Baking kiln	F_2	6.4	16	ppm					
	Stack	SO_2	800	800	ppm					
	Brick making					100	250	mg/m^3	20	30
PVC production	PVC production	HCL	67	201	ppm					
Zinc chloride production	Zinc chloride production	HCL	67	201	ppm					

Industry	Plant	Gaseous emissions				Particulates			Turbidity (%)	
		Parameters	Primary	Secondary	Unit	Primary	Secondary	Unit	Primary	Secondary
Sulfuric acid production	Oxidation of sulfur, hydrogen sulfide, alkylacid, organic sulfides	SO_2	380	456	ppm				10	20
	Oxidation of mercaptans and acid sludge	H_2SO_4				40	75	mg/m^3	10	20
Cement production	Kiln					100	150	mg/m^3	20	20
	Grinders					150	200	mg/m^3		
Foundries	Furnaces					100	250	mg/m^3		
Nickel chloride production		HCL	67	201	ppm					
Paper production (Crafts process)	Recycling furnace					150	250	mg/m^3		
	Reduced sulfur mud					5	10	mg/m^3		
	Non-expandable gases from other units					Must not be released to the air without treatment				
Coal production	Thermal dryers					75	150	mg/m^3	20	
	Coal cleaning					40	100	mg/m^3	20	
	Conveyers, transportation facilities					40	100	mg/m^3	20	30
Ceramic production	Backing	F_2	6.4	16	ppm	200	300	mg/m^3		
Asbestos production		Fiber				10	10	mg/m^3		
Gypsum kilns						250	600	mg/m^3		
Asphalt kilns						100	250	mg/m^3	20	5
Lead refining						50	100	mg/m^3	20	
Alpha-chloropropene acid		HCL	67	201	ppm					
Super Phosphate		F_2	100	150	ppm				20	20
Granular super phosphates		F_2	0.5	0.75	ppm				20	
Chlorhydric Acid and similar		HCL	67	201	ppm					

Industry	Plant	Gaseous emissions				Particulates			Turbidity (%)	
		Parameters	Primary	Secondary	Unit	Primary	Secondary	Unit	Primary	Secondary
Cyanhydric acid		HCN	8	10	ppm					
Nitric acid		NOx	350	500	ppm				20	20
Sodium carbonate and bicarbonate		NH_3	5	5	Kg/ton					
Sulfur carbon		S_2C	100	110	ppm					
Phosphoric acid wet method		F_2	10	25						
Super phosphoric acid		F_2	5	10					20	20
Diammonium phosphate		F_2	30	50					20	20
Lime						100	250	mg/m^3	20	30
Sewage treatment										
Sand crushing						150	150	mg/m^3		
Glass manufacturing		HF	36.6	48.8	ppm					
Waste incinerators (above 25 ton/day)						150	250	mg/m^3		
Ferric chloride		HCL	67	201	ppm					
Other		SO_2	800	800	ppm	100	250	mg/m^3	20	
		H_2S	7.2	18	ppm	100	250	mg/m^3	20	
		CO	304	435	ppm	100	250	mg/m^3	20	
		F_2	6.4	16	ppm	100	250	mg/m^3	20	

Appendix F Details of Pilot Projects

F1 Inventory Preparation for Stationary and Mobile Emission Sources (Pilot Project 1)

(1) Organization for Project Implementation and Roles of Participants

Pilot Project 1 (PP1) was designed to identify management issues to establish an inventory database for stationary and mobile emission sources in the Greater Tehran Area (GTA) for the effective management of air pollution control measures by DOE and related governmental organizations. It was viewed that the lack of a systematic inventory database had prevented proper management of these emission sources.

The JICA Study Team prepared a Terms of Reference (TOR) for the implementation of PP1. The TOR was reviewed and the team received feedback from members of Pilot Project Management Unit (PPMU) 1 and Working Groups (WG) 3 and 4, which were organized as advisory committees for each category of the JICA Study. PPMU 1 also advised the subcontractor of PP1 on the methodology of data collection and technical matters.

(2) Determination of Scope of the Project

The services of PP1 were subcontracted to a local consulting firm that was divided into two phases, one for stationary sources and another for mobile sources.

Phase 1 Contract

Stationary emissions sources: The GTA survey area was divided into zones 1 to 22 for Tehran city and Tehran suburbs were added to the nearest zones. In Phase 1 work, five zones (4, 5, 9, 18, and 20) were selected as typical industrial areas to use for a model for the collection of information for the inventory database. The following activities were conducted:

- Preparation of a list of individual emission sources;
- Data collection from selected zones from 2000, 2001, 2002, and 2003;
  - Energy and fuel consumption and pollutant emissions rates by individual sources
  - Future improvement plan of pollutant emissions through 2009 by individual sources
- Summary of data collection, fuel balance, pollutant emissions, and forecast through 2009 by zone;
- Database preparation in Microsoft Access and a GIS map with key information; and
- Database installation in a DOE-TPD system.

Mobile emission sources: The following information collection and tasks in 2002 and 2003 were described in the TOR:

- Preparation of number of registered vehicles by type and age;
- Traffic volume of vehicles by road and by type;
- Traveling speed of vehicles by type and by road;
- Data collection of fuel supply by area and by type;
- Estimates of emission factors from vehicles by type and age;
- Emission amounts and fuel consumption by area and by road;
- Estimates of emission rates from locomotives in GTA; and
- Installation of a database in a DOE-TPD computer system.

Phase 2 Contract

Stationary emission sources: The survey area covered the entire GTA except for the five zones selected in Phase-1. The following tasks were described in the TOR.

- Preparation of a list of major individual emission sources in remaining zone areas;
- Data collection from major individual emission sources in remaining zones in 2000, 2001, 2002, and 2003;
  - Energy and fuel consumption and pollutant emission rates by individual sources
  - Future improvement plan for pollutant emissions through 2009 by individual sources
  - Fuel (gasoline, diesel, and LPG) and CNG filling stations in GTA
- Summary of data collection, fuel balance, pollutant emissions, and forecast through 2009 by designated zone;
- Natural gas supply system and supply/demand balance in GTA in 2003 and forecast to 2009;
- Forecast of energy and fuel balance and pollutant emissions in GTA from 2003 to 2009;
- Database preparation in Microsoft Access and GIS map with key information;
- Database installation in DOE System; and
- Final Report of PP1.

Mobile emission sources: The forecast of emission rates from mobile sources will be investigated from 2003 through 2009.

- Estimation of the number of registered vehicles by type and age through 2009;
- Investigation of countermeasures for future improvements of emission factors through 2009 by enforcing vehicle regulations, fuel quality upgrades, fuel conversion to CNG, scrapping old vehicles, and traffic management; and
- Estimates of level of emissions by road and by area in 2009.

Selection of Subcontractor

From the nature of the project, the services of data collection and database preparation from stationary and mobile emission sources were undertaken under a single contract to minimize preparation time by DOE-TPD and the JICA Study Team, as well as to avoid duplication efforts, which resulted in cost savings.

In general, consultants in both categories are separated from each other in Iran. In particular, consulting services related to the mobile emissions survey are conducted by subsidiary companies under the control of MOT. Accordingly, for the tender of PP1, it was initially considered to invite a joint bidder or consortium to bid on both categories with the single responsibility of one partner. However, it was discovered that it would be difficult because of the small size of the work.

Therefore, after careful consideration with DOE-TPD, AQCC, under the control of MOT, was invited to bid on the contract because they had experience in the two previous air pollution studies in Tehran - JICA (1994) and World Bank (1997). Finally, a contract was made with AQCC after approval by JICA.

(3) Stationary Sources Inventory

Implementation Schedule and Process

Implementation schedule: Each category of the service was executed as shown in Table F.1 and F.2.

Process of data collection: In principle, data on energy and fuel consumption of stationary emissions sources were collected from relevant management authorities and organizations such as Center for Computer Services (CFCS), Statistical Center of Iran (SCI), MOE, MOIM, NIOC, IFCO, and the National Iranian Gas Company (NIGC). However, almost all data obtained from these sources was statistical data summarized in regions and sectors.

In addition to the above, AQCC created a questionnaire for about 500 industrial sources to obtain the latest (2002) data and received about 300 responses.

A database was created that summarized the energy and fuel consumed in GTA by region and individual source.

The pollutant emission rates from stationary sources were estimated based on available references.

In the course of the study, the team of consultants faced several problems as follows:

Difficulty of Collecting Data

- Access to detailed information from factories was not well organized in the government agencies. This significantly constrained the assessment of pollutant emissions from large-scale industries;
- The environmental information that does exist is often scattered across several government departments and is difficult to access from outside the agencies. This therefore required excessive time to gather the data;
- AQCC proposed the following suggestions for the preparation of an inventory database of stationary emission sources in the 4th Seminar of Tehran Air Pollution Management held on 8 February 2004 in Tehran; and
  - Preparation of individual emission factors based on process design (energy and mass balance) and measurements
  - Integrated households and commercial data
  - All data or information should be updated
- DOE-TPD has limited capacity in managing the database; therefore, training is necessary to familiarize them with its operation.

Table F.1 Schedule for Emission Inventory Survey for Mobile Sources

Year	2003			2004	
Month	Oct.	Nov.	Dec.	Jan.	Feb.
Mile Stone (Phase-1)	CC-1 PR (1-1)	PR (1-2)	PR (1-3)	Final Report-1	
(Phase-2)	CC-2 PR (2-1)	PR (2-2)	PR (2-3)	PR (2-4) Final Report-2	
(1) Preparation of Strategy for Data Collection and Commencement of Work					
(2) Data Collection and Analysis					
(3) Preparation of GIS Data Base					
(4) Investigation of Action Plan for Reduction of Pollutant Emission					
(5) Estimation of Pollutant Emission in 2003 and 2009					
(6) Installation of Inventory Data Base in TPD					
(7) Preparation of Final Report					

Note : CC : Consultant Contract
PR : Progress Report
Phase-1
Phase-2

Table F.2 Schedule for Emission Inventory Survey for Mobile Sources

Year	2003			2004	
Month	Oct.	Nov.	Dec.	Jan.	Feb.
Mile Stone (Phase-1)	CC-1 PR (1-1)	PR (1-2)	PR (1-3)	Final Report-1	
(Phase-2)	CC-2 PR (2-1)	PR (2-2)	PR (2-3)	PR (2-4)	Final Report-2
(1) Preparation of Strategy for Data Corection and Commencement of Work					
(2) Data Collection and Analysis					
(3) Preparation of GIS Data Base					
(4) Investigation of Action Plan for Reduction of Pollutant Emission					
(5) Estimation of Pollutant Emission in 2003 and 2009					
(6) Installation of Inventory Data Base in TPD					
(7) Preparation of Final Report					

Note : CC : Consultant Contract
PR : Progress Report

Phase-1 ━━━
Phase-2 ▪▪▪▪▪▪▪▪▪▪

(4) Mobile Sources Inventory

Management Issues

Management issues on mobile sources inventory are summarized in the following.

Difficulties of Collecting Data

Comprehensive information such as traffic volume, emission factors, road network, number of vehicles, and future transportation development plans, is required to develop an inventory database. Some data is required to be classified into details such as type of vehicle, district, and road section. Most data for mobile sources inventory is available; however, some is lacking and others are inadequate. For example, distributions of car age by type of vehicle and emission factors by car age and type of vehicle are insufficient, although they strongly affect the result of estimate. These facts make it difficult to collect proper data and as a result there is no alternative but to use or estimate some substitute data with less accuracy. It is necessary to continuously cooperate with related organizations in order to consider available data and methods to obtain more precise results.

On the other hand, some organizations, even public institutes, charge for data and information and others will not release their data. To make it easier and cheaper to develop an inventory, new regulations or laws should be established, which clarify that the DOE is responsible for developing the emissions inventory, which would require related organizations to cooperate with DOE more closely. Establishing and implementing these regulations/laws should be supported by the Executive Committee, if necessary.

Limited Capability for Developing Inventory Database

The database should be installed within DOE. However, there are few personnel who can develop and analyze the inventory database in DOE and equipments for analysis such as computer and software are inadequate. The theoretical understanding of database structures and the practical capability of updating and analyzing the database are essential to maintain them.

Unclear Focal Point for Emission Inventory for Mobile Sources

Implementation of the pilot project has revealed that there is a difficulty in disclosing information to outside organizations even though they accept the Ten-Year Action Plan. They may understand that the purpose of information acquisition is to accelerate the plan. However, they seem not to go beyond some internal constraints. To share relevant information is a fundamental requirement for success. The results of PP1 implied that further efforts to form more open linkages among stakeholders would require clarifying each organization's practical tasks. Such linkages should be based on a regulatory regime which induces information sharing by law.

Another point that the PP1 results imply is the necessity to enhance data management capabilities of DOE. DOE-TPD has a Deputy of Human Environment with a function of pollution source management as well as the Laboratory under his direction. There is also Human Environment Directorate in DOE. The section and the directorate are regarded as the responsible bodies to prepare the inventory and handling it when completed. However, they are not adequately equipped with data handling facilities nor with staff trained to cooperate with data resources.

F2 Introduction of Management Information System to EC (Pilot Project 2)

(1) Organization for Project Implementation and Roles of Participants

Organization for Project Implementation

Currently, an official in DOE-TPD, acting as the committee Secretariat, supports the current working of the EC (EC). He determines the venue for the next meeting, prepares agendas, issues invitations, and keeps meeting records. No other support services are provided to the EC. Pilot Project 2 (PP2) was conceived to strengthen the EC's Secretariat function by introducing a Management Information System (MIS).

In order to find ways to broaden the basis of the EC and inject ideas to implement PP2, Pilot Project Management Unit 2 (PPMU2) was established by the EC in June 2003. PPMU2 received assistance from a MIS expert from the Study Team to implement PP2. Thus, the organization to implement PP2 consisted of DOE-TPD, MIS Expert, and the local contractor, all under the supervision of PPMU2.

Participants and Their Roles

Original members of PPMU2 as appointed by the EC were as follows:

- Dr.Saeed Motesaddi Larandi: Director General and Environmentalist DOE;
- Mr.Faryabi: Representative of Ministry of Post, Telegraph and Telephone;
- Mr.Vahdati: DOE-TPD; and
- Mr. Hakimian. Project Director, DOE-TPD.

Persons responsible for PP2 in the Study Team were Mr. Owaki, the MIS expert, and Ms Leila Nadimi, counterpart.

Members of PPMU2 were later expanded to accommodate flexible working environment and included the following persons:

- Ms.Javaherian: Director General, Planning of Program Bureau, DOE;
- Mr.Baqeri: IT expert in Planning of Program Bureau, DOE, staff of Ms.Javaherian;
- Miss Eng. Eizad Panah: IT Expert, Staff of Dr.Saeed Motesaddi Larandi; and
- Mr.Mostafa Sarmadi: Office of the President, DOE.

Ms.Javaherian was in charge of information technology (IT) at DOE. She nominated Mr.Baqeri as an adviser for web design. Miss Eng. Eizad Panah was an assistant to Dr. Saeed Motesaddi Larandi, and she advised the team about air pollution observation data. Mr.Mostafa Sarmadi of DOE advised on project management issues.

(2) Determination of Scope of the Project

Repeated discussions among PPMU members and the Study Team outlined the scope of the project. Overall scope of the work was defined as follows:

- Improvement of EC management
  - Introduction of project management software to the EC to strengthen the management function of the EC.

  - Construction of communication network for EC members (introduction of email system).
- Information Sharing
  - Construction of the database for EC meeting minutes; any member of the EC can retrieve minutes anytime.
  - Construction of air pollution observation database: the EC members are able to access the air pollution observation data.
- Information disclosure
  - The activities of the JICA Study Team were disclosed to the public.
  - As there are diverse opinions concerning the disclosure of the raw data on air pollution, it was decided that the disclosure of the report or processed data should be made instead of raw data.
  - It is possible to disclose a part of the white paper on air pollution to the public through the web after it is issued in the future.

(3) Selection of Subcontractor

Selection of Sub-contractor for MIS Development

In Iran, software development is still in its infancy. Not many qualified companies are in operation. For example, an Internet search of *Iran and software* yielded homepages almost entirely made by Iranians in the US. The number of software companies, excluding individuals, amounts to about ten firms. The majority of software enterprises are small businesses owned and operated by an individual and a few associates. Therefore, the subcontractor came from the Faculty of Environment at the Tehran University.

Selection of Sub-contractor for Web Development

Technology for advanced system development was not necessary. A tender was put out for bid on October 25, 2003 and three organizations submitted proposals. The Faculty of Environment of Tehran University was declared the winner after the technical and cost evaluations.

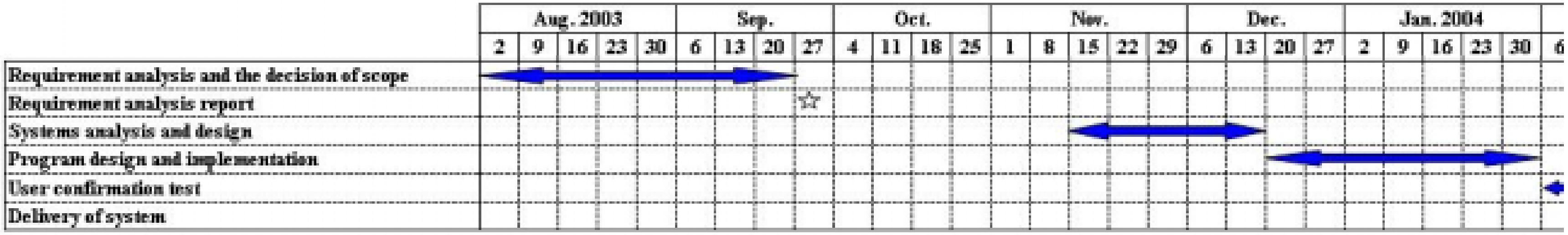
(4) Implementation Schedule and Processes

Implementation schedule and processes are shown in Figure F.1.

(5) Analysis of the Results

Initially, the following work was carried out:

- Analysis of current situation;
- Requirement analysis and determination by PPMU2;
- Negotiation and identification of systematized area;
- Database design and function design;
- Operation design;
- Detailed design;
- Programming and test;
- User confirmation test;
- Input of real data in the database; and
- Installation of software and the database in the practical environment.



Web site development schedule and milestone

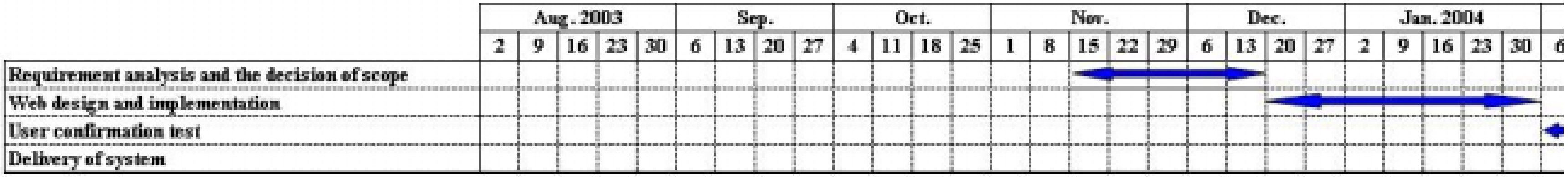


Figure F.1 MIS Development Schedule and Milestones

For the website development, the following work was carried out:

- Collection of all available data;
- Organization of the information;
- Definition of all activities in EC;
- Selection of a visual appearance;
- Definition of working environment;
- Design of web pages;
- Development of contents of website;
- Installation of contents in the operational environment;
- Implementation of the website; and
- Testing the website.

Through the above activities lessons were learned and are described in the following sections.

Analysis of Work

IT situation in Iran: Software technology in Iran is at its infancy. Although excellent engineers exist, academia emphasizes hardware, as opposed to software engineering. The usage of IT in government offices such as DOE is limited to word processing, email, Excel, and PowerPoint. Information sharing via databases is not utilized extensively. However, some private companies are advanced in IT. As the majority of software companies do not allow public access to their homepages, it can be inferred that the Internet has not been accepted in Iran.

Accuracy of data and information disclosure: Dr.Motassadi's office has already established a database of air pollution observations by using SQL Server. However, contents of the database have not been disclosed to the public. The major reason cited for non-disclosure is data accuracy. It is feared that once disclosed, someone might analyze inaccurate data and make an incorrect report.

Such a fear is understandable. However, disclosing such data with a disclaimer for inaccuracy and possible sources of errors may lead to improvements, such as increased budget appropriations. Data should be disclosed to the extent possible provided proper explanations are supplied.

One clear advantages of computerizing data is that a computer system can easily pinpoint erroneous individual data, so that they can be corrected or rejected by the user. Under such an environment, data should be disclosed.

Application of IT for more efficient EC activities: MS Project, Project management software, was installed as a part of the EC MIS system and is ready to be utilized. Similarly minutes of the past EC meetings have also been stored in the EC MIS system through the 100th meeting. The next step is to establish managerial procedures to utilize them.

Although the above software and database is useful, they do not automatically supply useful information to guide the EC members unless they are properly and continuously maintained and utilized. It is extremely unlikely that the current EC members would do this through their own computer terminals. Rather, they should be maintained and utilized by the EC Secretariat. The existing one-man Secretariat is unable to do that, hence the need for its expansion.

(6) Management Issues

Changes in EC Discussions

Meetings not supported by solid data and past records tend to exchange opinions, but not move forward. Therefore, use of the MIS could drastically change the nature of EC discussions. For any topic, when records of past discussions are available, repeat discussions could be avoided and members could take a more constructive approach. When an accurate picture of project progress is shown, discussions could be more focused and decisions can be made. It would take less time to reach a compromise between members.

Changes in members' attitude and faster and better decision-making can be expected provided that such information is supplied by a properly functioning Secretariat.

The following notes should be carefully considered to introduce a MIS:

- A director of the EC Secretariat should work full time and assign clear roles and jobs to each staff member;
- Enough skilled manpower should be assigned to the EC Secretariat;
- Goals should be set so that EC Secretariat members can share them; and
- The EC Secretariat should inform EC members of their roles, benefits, and importance of new functions of EC Secretariat.

Information sharing among agencies and organizations

There is no doubt that sharing information among people would benefit society as a whole. However, as being observed, those who had information were less willing to share it because they did not see the benefits. It must be shown that information sharing benefits all and MIS can play such a role. MIS is in essence sharing of information. Through the activities of the EC, Secretariat, and the MIS, improvements should be observed. Only then, will individuals see the merits of sharing information.

F3 Preparation of White Paper (Pilot Project 3)

The White Paper is the report to be prepared by the Cabinet on a specific subject for presentation to the Diet (Parliament). Such White Papers are made on many government topics, such as industry, agriculture, forestry, and transportation.

In general, White Papers are published for the following reasons:

- To provide the most recent and accurate data to the public;
- To coordinate the positions or views of relevant ministries and agencies in connection with specific issues; and
- To announce government policy.

In the area of environmental protection, the White Paper enabled coordination and cooperation among related organizations because environmental issues are widely recognized as interdisciplinary.

Article 12 of the Basic Environment Law (Japan) is as follows:

Article 12 (Annual Report)

- The Government shall submit annually to the Diet a report on the state of the environment and the policies implemented with regard to environmental conservation; and
- The Government shall make and submit annually to the Diet a document explaining the policies the Government is going to implement considering the State of the environment as described in the report in the preceding Paragraph.

Since this is a pilot project, the above-mentioned elements needed to be modified. The details of Pilot Project 3 (PP3) are given in the following sections.

(1) Organization for Project Implementation and Roles of Participants

The relevant Ministry or Department usually prepares White Papers in charge of environmental issues, like DOE. Such an organization has the following two mechanisms in it.

Drafting office:
An office in the Ministry where the draft of the White Paper is prepared.
This office must have large capacity to coordinate all information.
Coordination mechanism:
An office in the Minister's Secretariat. Such offices coordinate how to respond the draft and make it flawless.

Since this is a pilot project in the GTA and the subject is limited to air pollution, DOE-TPD, rather than DOE, was considered suitable for the project's implementation. One or two consultants with the guidance of PPMU could write the White Paper. For the coordination mechanism, the supporting office of Executive Committee of DOE-TPD oversaw the project.

(2) Determination of Scope of the Project

Environmentally focused White Papers usually covers all fields, including international affairs, from the viewpoint of national government in order to integrate and present the government's views to the public. It is supposed to include the most accurate and latest information available. In short, it gives a common ground for environmental protection activities for the government and the people.

For the pilot project, the subject matter was confined to air pollution issues in GTA and the purpose of the project focused on quality of information, more experience in coordination, and cooperation processes. The ISO14001 process was used – plan, do, check, and action. The preparation of the White Paper is related to the check step, used to decide whether further actions are needed.

The issues to be discussed in this project were left up to the PPMU, based on their knowledge and experience in the government.

(3) Selection of Subcontractors

Among three Iranian consulting companies, Pyramoon Co., Zist Sepehr Environmental Research and Engineering Services, and ParsWista Co., Zist Sepehr Environmental Research and Engineering Services was nominated as the subcontractor for this pilot project. The firm had abundant experience, strong human resources, and strong connections with the government.

(4) Implementation Schedule and Process

The outline of the workflow is given below:

- Selection of several subject areas by the consultant, including the coordination mechanism itself, to be discussed for air pollution control in the GTA. (See Note 1 below);
- Examination of the selected areas with PPMU;
- Propose the outline of this project to the EC and request cooperation from concerned organizations in the coordination process. (a member of PPMU);
- Gather information regarding selected topics;
- Make the outline of the topics in English;
- Make the draft of the White Paper;
- Examination of the draft with the management group;
- Completion of the draft and its translation into Farsi;
- Request comments of related departments, etc. through the supporting office of the EC;
- First modification of the draft;
- Second request of comments to the modified draft;
- Second modification of the draft;
- Presentation at the EC for authorization;
- Modification, if necessary, of the draft; and
- Translation into Farsi (completion of the final White Paper of the project).

Note: 1. Subject areas should be air quality in GTA, monitoring system in GTA, environmental assessment system, implementation of air pollution abatement law, and the government's coordination system in the government.
2. The comments of the relevant WGs should be requested and reflected in the proper manner.

And, in this project, it was requested to use mainly the information presented (authorized) by the governmental office (s) when drafting the documents.

Steps 1 to 5 were implemented in the 1st Phase. Steps 6 to 15 were implemented during the 2nd Phase, which started on October 1, 2003 and terminated at the end February 2004.

(5) Analysis of the Results

In other countries, similar attempts to produce a White Paper have been unsuccessful. Even with the limited time and resources, this project demonstrated the capabilities and interest in the government for this topic. This observation was made firmer after Iranians indicated their interest in continuing the project, with the support of JICA's expertise.

Results

This project followed the TOR. The subcontractor was required to choose, with the help of PPMU members, the items to be discussed in the White Paper. This was based on the consideration that the first version would have to refer to basic information about the air pollution control and the basis of the White Paper is its design in relation to the policy statements. This was accomplished properly. The table of contents are listed as follows, which were copied from the second version of the draft White Paper of December 2003:

Chapter One: Introduction
- 1.1. Iran at a Short Glance
- 1.2. The Greater Tehran Area
  (Population, Geography, Climate, History of Urban Development, etc.)

Chapter Two: Legislative Framework
- 2.1. Major Legislation on Environmental Pollution Control
- 2.2. Regulations and Mandates on Air Pollution
- 2.3. Air Pollution Standards (Ambient and Emission Standards)

Chapter Three: Air Pollution Control Decision-making and Coordination
(Environmental Protection Supreme council, Executive Committee for the Reduction of Air Pollution, etc.)

Chapter Four: Public Awareness and Participation
(Media, NGOs, Education, Private Enterprises, etc.)

Chapter Five: Air Quality of Tehran
- 5.1. Air Quality Monitoring System
  - 5.1.1. Background of Air Quality Monitoring in Tehran
  - 5.1.2. Air Quality Monitoring Networks
  - 5.1.3. Historical Trend of Air Quality

Chapter Six: Major Stationary Sources of Air Pollution
(Major Sources, Daily Discharge of Pollutants, etc.)

Chapter Seven: Mobile Sources of Air Pollution
- 7.1. Overall Situation
- 7.2. Road Network
- 7.3. Vehicular Profile
- 7.4. Regulations and Standards, etc.

Chapter Eight: Major Pollution Control Measures
(Major Programs, Implementing Agencies, Achievements, Future Plans and Programs, etc.)

Chapter Nine: Air Pollution Contingency Plan
(Contingency Rules and Regulations, Emergency Situation)

Another requirement was to use the information presented and authorized by government offices when drafting the documents. Since the subcontractor has many government connections, this was not a problem.

One of the most important elements of this project was the time schedule illustrated in the TOR. In Phase I, there appeared to be no problems, though in the second Phase progress slowed, due to unexpected difficulties; the difficulties to get some necessary information from other organizations; and the coordination requirements, which were not supported by legal regulations or customary obligations.

In spite of the difficulties listed above, the White Paper was completed. Additional achievements occurred in that Dr. M.H. Pirasteh, the Director General of the DOE-TPD wrote in his Foreword for the White Paper:

> "We are inclined and hopeful that this will be updated and disseminated annually. The report is to provide the most accurate and updated information about the problems concerning air pollution in the GTA as well as the ongoing and planned activities to address those problems."

Analysis

Basic information about Tehran and GTA was included, which was necessary as this was the first version of the White Paper. Also, it appears that government organization descriptions were included because it was the first White Paper, although this is unusual. The paper should clearly focus on legal requirements, policy measures, public works, environmental effects, and future movement, in addition to current data. As readers expect current information, it is anticipated that proper analysis of the data should be undertaken through administrative activities.

As for the continuation of the White Paper, it is necessary to note that DOE-TPD alone does not have sufficient resources, as well as the authority, to complete a proper White Paper. This is especially true with regards to coordination. Preliminary steps will be necessary to overcome this.

Additional consideration must be given for the issues identified in this version. There are many opinions as to what should be discussed in the White Paper. Though it might be difficult to reflect all of them, there needs to be a clear path to make sure as many opinions are collected prior to the next White Paper.

Management Issues

Since this pilot project was designed to contribute to MAP formulation, it was expected to produce a useful list of issues or propositions. For example, chapter 5 is devoted to the present monitoring system, the most important element in the field of air pollution control. It says that two organizations, DOE and MOT, are running individual measurement networks and that efforts are being made to consolidate both networks in terms of data generation, processing, and reporting. If such efforts are overlooked, an integrated official announcement of air quality in Tehran will be impossible, as will a development plan for upgrading the monitoring network..

Likewise, the White Paper also refers to the stack sampling devices that DOE and some research organization have. It is important to clarify their duties and responsibilities in order to produce official views or evaluations. This would also affect the air pollution contingency plans that seem to require a more streamlined solution. The White Paper could clarify such issues.

When PP3 was designed, the most crucial point was the identification of a coordination organization. The Executive Committee was chosen for this role. DOE should have had this responsibility, but lacks the power, although even the EC, with the power, did not successfully accomplish the goal. The outcome demonstrates a lack of coordination among related organizations, especially at the lower levels of government. This shows a tendency to allow environmental decision-making to be dependent on the high-level discussions. Regardless, the number of the officials working for the Executive Committee is too small to undertake this responsibility anyway.

F4 Consideration to Improve Used Vehicles through Exhaust Emission Measures (Pilot Project 4)

(1) Introduction

The Government of Islamic Republic of Iran approved the Action Plan for Controlling Air Pollution in Greater Tehran Area (Ten-Year Action Plan) in February 2000. Among several plans, the replacement of carburetors in existing Paykans was proposed as a countermeasure for emission reduction from used cars. Under these circumstances, IFCO placed an international

tender for proposing innovative technologies to replace carburetors. After evaluating 80 technical proposals, seventeen proposals were selected and were tested starting in July 2001.

The best system was the UCAL system, which is a vertical remodeled carburetor produced by UCAL Corporation of India. In April 2002, it was verified that the UCAL system could achieve an 80% reduction of CO emissions and reduce gasoline usage by 30%. In November 2002, the system was improved by remodeling the manifold to solve the remaining problems of power loss under high speed.

DOE announced the carburetor replacement in used Paykans in November 2002 and AQCC, a subsidiary of Teheran Municipality, announced the implementation of the replacement. As of February 2003, nothing had been accomplished when Pilot Project 4 (PP4) was discussed.

In order to promote emissions reduction from used cars by replacing the carburetor, the following five components should be prepared:

1. Technical issues should be solved;
2. Financial and budgetary frame should be arranged;
3. Institutional and organizational framework should be developed;
4. Awareness of individual drivers should be raised; and
5. Strict enforcement of traffic laws by traffic police.

Present situation of the above-mentioned five components is:

Re 1: Based on the laboratory testing, the UCAL system was judged to be the better solution, in comparison to the other options, although it was not the best solution. Hence, it is appropriate to consider that technical issues have been solved for the time being.

Re 2: DOE arranged with NIOC the financing for the replacement in 10,000 used Paykans in March 2003. Formally, DOE and AQCC announced the implementation, which implies that there are not any barriers with regard to the financial and budgetary framework.

In spite of technical and financial achievements, replacement works have not been implemented at all. Under these circumstances, PP4 was organized focusing on two issues as follows:

Replacement of Carburetors of Used Paykans and Measurement (PP4 (1))

Based on the assumption that one of main reasons that the project has not been implemented lies in institutional and organizational components, PP4 (1) study was designed. Through implementation of the project, issues and problems are expected to be identified. PP4 (1) may provide with basis of problems finding. Through discussion within PPMU4, identification of issues to be discussed in WG to formulate MAP is expected.

To Motivate Individual Drivers for Retrofitting their Cars for Emission Reduction (PP4 (2))

It is essential to motivate individual drivers to implement carburetor replacements. As one part of PP4 is social survey (PP4 (2)), a survey of drivers of used Paykans will be conducted.

(2) Organization for Project Implementation and Roles of Participants

Originally PP4 was comprised of a technical component (replacement of carburetors and measurement) and social survey component. Because of time constraints, the project was divided into two parts:

PP4 (1): Replacement of Carburetor and Measurement
PP4 (2): Survey on Raising the Awareness toward Air Pollution Control

Functions required by organizations of the carburetor replacement projects are classified by following four categories:

1. Policy formulation;
2. Project management;
3. Project implementation; and
4. Manufacturing material.

As is described in the introduction, the target of PP4 is to examine implementation organizations, especially those focused on project management. The government should undertake policy formulation and project management, while project implementation and manufacturing materials should be undertaken by the private sector. In PP4, newly formulated PPMU 4 will function as the Project Management Organization and the contracted consultant (AQCC) will function as Project Implementation Organization. Policy formulation will be undertaken by the Executive Committee as was approved in the February and June 2003 meetings.

(3) Determination of Scope of the Project

Outline of the pilot project is summarized in Table F.3.

Table F.3 Project Summary of PP4

	Summary
Project purpose	Examine strategies to promote retrofitting used Paykans by installing remodeled carburetors
Outputs	Institutional/organizational structure be proposed Propose strategies to raise awareness
Activities	1. Verify performance of remodeled vertical carburetor (UCAL) 2. Select 50 demonstration cars to monitor and install UCAL carburetors 3. Measure performance of carburetors in demonstration cars by idling test mode and ECE 15 mode 4. Conduct questionnaire survey to used Paykan drivers 5. Examine strategies to promote retrofitting

PP4 (1)Replacement of Carburetors and Measurement of Results

1. Selection of demonstration Paykans
   Demonstration cars are to be selected from the following car categories:
   15 cars – 2~5 years old, 20 cars – 6~10 years old, 5 cars – 11~15 years old,
   10 cars – 16~25 years old

2. Selection of remodeled carburetor;
3. Procurement of materials;
4. Replacement of carburetors;
5. Measurement of emissions; and
   - Exhaust test in idling mode
   - ECE-15 mode test
   - Follow-up survey
6. Analysis.

Survey to Raise Air Pollution Control Awareness

1. Preparation of campaign brochure;
2. Preparation of questionnaires;
3. Interviews of drivers;
4. Analysis of results; and
5. Examination of strategy to raise awareness.

(4) Selection of Subcontractors

In selection the consultant for PP4 (1), the following items were reviewed:

- Experience and expertise in carburetor improvement;
- Familiarity with UCAL carburetors and accessories;
- Qualifications in project management;
- Accessibility to chassis dynamo testing; and
- Acquaintance with organization formulation and institutional study.

IPCO, Tehran University, Iran Automobile Engineering Consultant and AQCC submitted bids and after six months, contracts for PP4 (1) Phases 1 and 2 were given to AQCC. For PP4 (2), three firms were invited for tender and Iran Orthopaedic Association was awarded the contract.

(5) Implementation Schedule and Processes

Replacement of Carburetor and Measurement of Results

Replacement of carburetors and measurement of results (PP4 (1)) was designed to identify issues in implementing the retrofitting project and demonstrating retrofitted cars to the targets. The implementation schedule of PP4 (1) and (2) is as shown in Figure F.2.

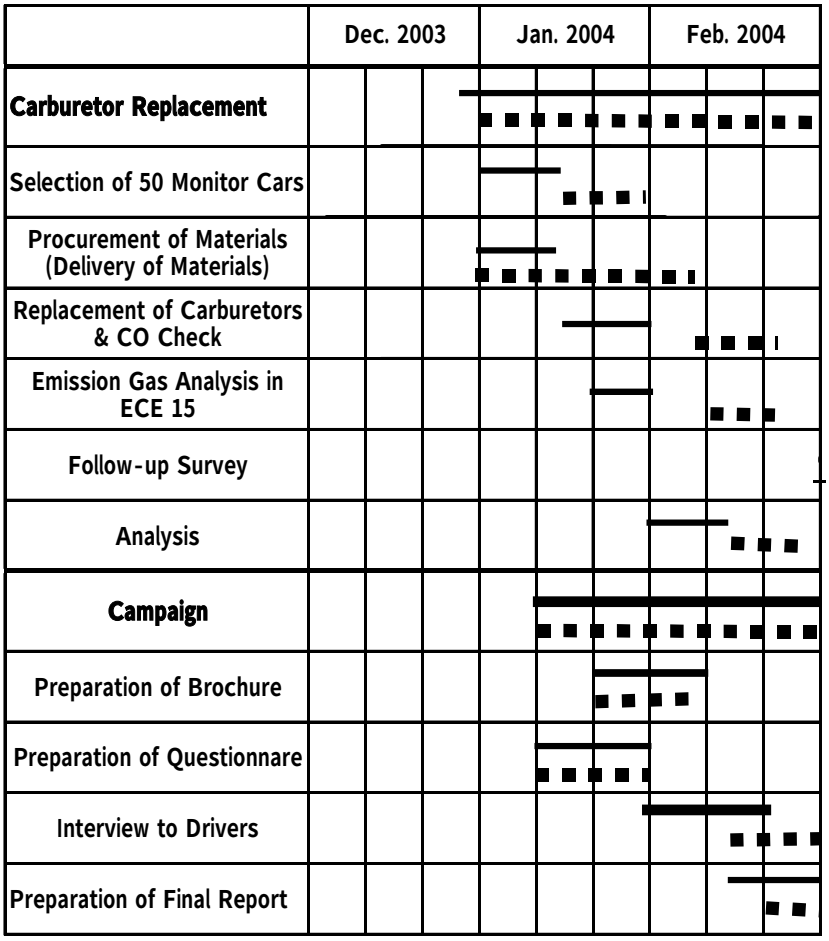


Figure F.2 Implementation Schedule of PP4 (1) & (2)

Because of delay of delivery of materials, replacement work was delayed by three weeks. As a result, all other work was delayed by three weeks as well. Followings are specific remarks related to PP4 (1).

Selection of demonstration cars: Fifty Paykan cars from different age ranges were selected to have their original carburetors replaced with remodeled ones. Originally using cars from private owners was considered. During project preparation, it was decided to use taxis instead as there were no incentives to use private cars and there was the possibility of legal issues. The sustainability of the new carburetors will be verified by ECE 15 mode after 10,000 km driving. AQCC advertised for demonstration taxis in newspapers and received a good response.

UCAL carburetor: Materials used in PP4 (1) are UCAL carburetors – rated highly by IPCO in terms of cost performance. According to the IPCO report, performance of the electronic fuel injection system, which is not equipped with a catalytic converter, does not demonstrate superiority to the remodeled carburetors.

The original Paykan carburetor is a simple variable venturi carburetor. These carburetors cannot supply mixtures with an appropriate air fuel ratio (A/F). Moreover carburetors of this type have

movable parts called suction chamber pistons and frequent tune-ups are necessary. The remodeled carburetor is a fixed venturi type and is comprised of five independent systems, from the idling to acceleration stage and they make smooth adjustments to the A/F ratio.

Replacement works: Replacement work on the demonstration cars was finished 16 days after the project started, as they could replace carburetors on a maximum of 12 cars per day.

Measurement: ECE 15 mode tests were conducted at the Automotive Industries Research and Innovation Center (AIRIC) for five taxis. Tests were conducted before and after replacement. Sustainability tests will occur after 10,000 km and CO tests were conducted on all cars before and after the replacement.

PP4 (2) Raising Awareness

The present study will examine the strategy to strengthen and improve air quality management in GTA. In this regard a campaign (PP4 (2)) is designed to raise the awareness of car drivers to replace the new carburetor toward Air Pollution Control.

A questionnaire-based survey will be performed in cooperation with AQCC. In order to provide general information about the project's benefit, a brochure will be designed and trained drivers will demonstrate the carburetor. Then, the questionnaires will be completed by interviewing 500 drivers who attend ten garages for tune-ups. There are 37 questions in five sections: demographics, driving condition, driver's general knowledge, awareness, and comments. To ensure that all methods were satisfactory, pilot tests were carried out with a small sample of drivers. Changes were made to the questionnaires afterwards.

The responses were analyzed based on qualitative statistics. Major finding were as follows:

Socio-demographics

- Majority of respondents (62%) had monthly income of 2,000,000 Rls or less.

Car Specification and Status

- Most cars were produced in the 70's (65%) and purchased in the 80's (74%);
- 39.2% had a weekly expense of 90,001 Rls or less for fuel and an average weekly fuel expense of 70,000 Rls;
- 39.3% spend 2,500,001 Rls or less for carburetor repairs. 42.9% spend 500,000 Rls or less annually for engine repair. The annual average expense for engine and/or carburetor repair was 1,051,994 Rls; and
- The majority of respondents (57%) did not have any plans to buy a new car and wanted to continue using their old car. 42% said this was due to lack of money to purchase a new car.

Knowledge about Air Pollution and New Carburetor

- 79% of respondents had no knowledge of emission standards and 58.6% had no knowledge about emissions in their own cars; and
- 94.2% of respondents had no knowledge of new carburetor before arriving at the garage.

Attitude about Effects of Improving Cars on Health and Air Pollution.

- 99% of respondents believed that high emissions is one of the major causes of air pollution and 99.4% of respondents believed that air pollution is the major cause of diseases;
- 96.2% of respondents expressed desire to improve their car in order to reduce emissions and subsequently reduce air pollution;
- While the majority of respondents know about the effects of emissions and air pollution on health, most (73.6%) did not want to pay for the replacement of a new carburetor. 25 % said they would pay 50% of cost and 1.4 % agreed to pay all costs;
- 67.5% of respondents were very interested in paying for the new carburetor if prices are within their budget; and
- 68% of respondents said that the survey and surveyor explanations increased their knowledge of the new carburetor and the majority of respondents (77%) choose TV as the source of the public awareness campaign.

(6) Management Issues

The objective of PP4 is not to retrofit used cars *per se*, but to identify issues that slow down the implementation of carburetor replacements. As is described in the introduction, PP4 focused on:

- Organizational issues on replacement of carburetors of used Paykans and measurement of results (PP4 (1)); and
- Examining how to motivate individual drivers for retrofitting their cars for emission reduction (PP4 (2)).

Ambiguous roles and responsibilities among related organizations: The first problem encountered just after commencement of the project was who should be responsible for the project. According to the Ten-Year Action Plan, AQCC, a subsidiary of MOT, was the responsible organization. However, AQCC has not acted in this way. In an interview with AQCC representatives, they said that they were ready to implement the carburetor replacement project after devices were provided by MOIM.

Activities and relevant organizations related to retrofitting used cars are listed below:

- Establishment of exhaust standards: DOE;
- Development of emission reduction devices (remodeled carburetors, catalysis, etc): MOIM;
- Project management of retrofitting: DOE, MOT; and
- Implementation of retrofitting: garages, car manufacturers, etc.

What can be observed is that having a single organization fully responsible ensures a smoother project, whereas more than one organization ensures challenges. In the latter case, it seems that no one bears total responsibility. Thus roles and responsibilities of respective organization become ambiguous.

Unclear Certification of Technology System

PP4 was organized based on the understanding that a technological solution would occur by applying UCAL carburetors and therefore, a large budget was set aside. During project preparation, it was recognized that the evaluation of UCAL carburetor was incomplete. The test

laboratory and manufacturer claimed it had been verified, while some of government officials who were to issue the certificate claimed it was not verified. Consequently, PP4 (1) was organized to achieve verification of the performance of the carburetor. The outcome of whether UCAL is verified or not should not delay implementation, as one and half years would be wasted.

To lessen emissions from used cars, retrofitting devices like UCAL carburetors, injection systems, and catalytic converters are prerequisites. To promote the development of retrofitting devices, organizations related to development and verification requirements and procedures must be clarified.

Needs for socio-economic survey on targeted drivers: Respondents believed that high emissions are one of the major causes of air pollution and diseases and reducing emissions would control air pollution. Respondents also showed interest in improving their car to reduce emissions and air pollution. However, limited knowledge on the new carburetor and affordability prevented them from taking action. Considering these situations, first, affordability should be carefully surveyed. Then, government support, based on replacement costs and drivers' income, should be designed and schemes should be announced on TV. Without knowing socio-economic backgrounds of targeted drivers, the feasibility of appropriate schemes cannot be examined.

MAP Related to PP4

As was described before, the objective of the pilot project was to identify issues and problems during project implementation and propose possible solutions to cope with them. The following items are necessary to promote retrofitting and among these, items 1 and 3 are in the MAP as explained in Chapter 5.

1. Technology development: Establish a technical acceptance certificate;
2. Subsidy: Establish a subsidy to retrofit Paykans;
3. Institution and Organization: Establish a PMU;
4. Raise awareness of individual drivers; and
5. Enforcement by Traffic Police.

(7) Questionnaire

Appendix B
Questionnaire

Questionnaire No: Date: /04
Surveyor: Car Number:

Demographics:		
1	Sex	Male ☐ Female ☐
2	Age	
3	Education	
4	Occupation	
5	Monthly income (average)	Rials
Car specifications:		
6	Car type (model)	
7	Production year	
8	Purchasing year	
9	Purchasing status	Brand new ☐ Used ☐
10	Purchasing price *(if agreed)*	
11	What is your purpose of use of the car?	Company affaire ☐ Non-official taxi ☐ Taxi (Travel Agency) ☐ Taxi (Public) ☐ Private ☐ Others) ☐
Car Condition:		
12	How much is your weekly fuel consumption?	Liters
13	How much is the weekly expenses for the fuel of your car?	Rials
14	How much is the annual average expenses of the engine of your car?	Carburetor adjustment/repair & spair parts Rials Engine repair Rials
15	Do you have inspection certificate?	Yes ☐ No ☐ (reason
16	If you have failed in the inspection, what were the reason(s) for failure?	
Driver's general knowledge and awareness:		
17	Do you have a plan to purchase a new car?	Yes ☐ No ☐ (reason *If answered "YES" for Q17, please answer the Q18*
18	What kind of car do you plan to purchase?	
19	Do you know about the official announcement to scrap down old cars over 15 year?	Yes ☐ No ☐
20	Do you know the standards of emission gas quality? *(in general)*	Yes ☐ No ☐
21	Do you know the emission gas quality of your own car?	Yes ☐ No ☐ (reason
22	Do you know about new carburetor before attending the garage?	Yes ☐ No ☐ *If answered "YES" for Q22, please answer the Q23*

23	How knowledgeable are you about new carburetor?	Very □ Slightly □ Somewhat □
24	Do you know that high emission gas quality is one of the major causes of air pollution?	Yes □ No □ (reason:
25	Do you believe in that reducing emission gas will contribute to the air pollution problems?	Yes □ No □ (reason:
26	Do you believe that high emission gas quality is one of the major causes of diseases?	Yes □ No □ (reason:
27	Do you tend to improve your car in order to reduce gas emission quality and subsequently reduce air pollution?	Yes □ No □ (reason:
28	Regarding to benefit of new carburetor in reducing air pollution and diseases, how much would you like to pay for replacement of new carburetor?	All cost (approx R. 2.000.000) □ 50% of cost □ none □ (reason:
29	How interested would you be in buying the new carburetor if priced within your budget?	Not at all interested □ Not very interested □ Somewhat interested □ Very interested □
30	To what extend have the explanation on the mechanism of new carburetor increase your knowledge about it?	Very much□ a few □ Somewhat □ Not at all □
31	Are you satisfied with the demonstration of mechanism of new carburetor?	Yes □ No □ (reason:
Comments:		
32	Which of the following sources of information would be useful to promote and make decisions about buying new carburetor?	Newspaper □ TV □ Radio □ Colleagues □ Personal experience □ Outdoor ads. □ Indoor ads. □ Brochures and catalogues □ Other □ ..... ***(Please check all that apply)***
33	What is your comment (s) on the carburetor replacement?	
34	Driver name ***(if agreed)***:	
35	Driver address ***(if agreed)***:	

Appendix G Review of On-going Ten-Year Action Plan

G1 Background of Action Plan

Regarding the vastness and complexity of concerned issues and the multi-dimensional aspects of implementation methods for combating air pollution, three scientific studies were carried out with the cooperation of international research centers, as follow, between 1993 and 1997:

1. An integrated Master Plan of Air Pollution Control in the GTA (a joint project of Municipality of Tehran (MOT) and JICA, Japan.);
2. Tehran Transportation Emission Reduction (a collaboration of MOT and World Bank.); and
3. Control of motor Vehicles Emission (a joint project between academies of Science & Ministry of Industry of I. R. Iran.).

The Executive Committee decided to integrate the results of the above studies and formulated a "Ten-Year Action Plan for Transportation Air Pollution Reduction in Tehran" and classified it into 7 basic Fields, which was approved by the Executive Committee and the Cabinet in February 2000.

Section 3.2 summarizes each Field and its progress up to January 2004 based on the paper originally prepared by the Executive Committee Secretariat in January 2004 while Section 3.3 summarizes the reviews by the JICA Study Team based on information collected through the second phase of the Study.

G2 Fields of Action Plan and their Progress

(1) First Field: New Motor Vehicles

Objectives:	In order to reduce pollutants by new motor vehicles, use of combustion systems utilizing catalytic converters and related accessories for reduction of pollutants is desired. This is to meet the emission standards of ECE 15.04 and then ECER 83.
Projects:	Standard for Imported Vehicles, Standard for Domestic Vehicles, Standard for Large Vehicles, Enforcement of Standard for Motorcycles
Implementing Org.:	Ministry of Industry

Table G.1 Progress up to January 2004: New Motor Vehicles

Major Projects	Progress and Status	Obstacles/Comments
Implementation of ECER 83 for domestically produced light duty motor vehicles	ECE 15.04 started in June 2001 and ECER 83 will be implemented in the year 2003-04	Other ECER 83 steps will be followed, requiring the cooperation of the Ministry of Industry. It depends on modification of fuel quality.
Implementation of EU2000 for heavy duty motor vehicles	The first step will be implemented in the year 2003-04	
Implementation of ECER 49 for heavy duty motor vehicles	Not yet started	Prior to project implementation, the provision of machines is required.
Implementation of ECER49 for all mini-buses	Not yet started	Implementation will be taken after the conversion of system into gas.
Implementation of ECER 49 for import mini-buses	Not yet started	Mini-bus import is banned.
Implementation of ECER 49 for heavy duty motor vehicles	Not yet started	Prior to project implementation, the provision of machines is required.
Implementation of ECER 49 with catalytic converters.	Not yet started	See Above
Modification of bus systems for use of Compressed Natural Gas (CNG) along with installation of catalytic converters	Approx. 1,000 completed	
Implementation of EU 97 for motorcycles along with improvement of fuel system	Will be implemented from the year 2004-05	Although the industry had agreed to the terms, this requires the cooperation of a large number of producers.
Implementation of EU 97 for gas motor cycles along with modifying fuel system	Not yet started	Prior to project implementation, a change of engines is required.
Use of catalytic converters for motor cycles	Not yet started	See Above

(2) Second Field: Used Vehicles

Objectives: Older moving vehicles, driving styles, and the low quality of spare parts have caused the rapid deterioration of motor vehicles in Tehran, which in turn has led to wasted fuel and air and noise pollution. The second field aims to formulate comprehensive programs for substituting older vehicles with new ones and enforcing standards. This includes an anticipated reduction, based on research, in the amount of emissions within 10 years.

Projects: Conversion of injector carburetor for Paykan over 10 years, installation of catalytic converters for gas fueled taxis, equipping motorbikes with catalytic converters, renewal of passenger cars.

Implementing Org.: Ministry of Industry, Teheran Municipality

Table G.2 Progress up to January 2004: Used Vehicles

Major Projects	Progress and Status	Obstacles/Comments
Conversion of injector carburetor for Paykan over 10 years	Not yet started	Lack of machines, workshops, and budget. Requires cooperation between Municipality of Teheran, M. of Industry, and production industry.
Installation of catalytic converters for gas fueled taxis	Not yet started	Prior to the project, conversion of system from liquefied petroleum gas (LPG) to CNG, which is under implementation by the Municipality of Teheran and M. of Oil (Field three), is required.
Equipping of motorbikes with catalytic converters	Under research	Difficulties in dealing with large numbers of producers and motorbikes in use.
Scrapping and Renewal of 200,000 passenger cars	It will be followed up by Islamic Consultative Assembly and Board of Ministries	Although the Board of Ministries approval it, Cabinet, M. of Industry, and Bank have not met the agreement.

(3) Third Field: Public Transportation

Objectives: This field aims to quantitatively increase the public transportation fleet, especially in utilizing clean fuels for taxis, minibuses, and buses, facilitating the completion of metro lines, as well as use of other light rail transportation.

Projects: Increasing the number of buses, conversion of fuel system of buses into LPG, installation of catalytic converters on CNG buses, conversion of fuel systems of diesel mini-buses into CNG, acceleration of Metro and Light-Rail public transportation.

Implementing Org.: Ministry of Interior (MOI), Teheran Municipality

Table G.3 Progress up to January 2004: Pilot Transport

Major Projects	Progress and Status	Obstacles/Comments
Quantitative increased of buses up to 6,000	Completed	
Conversion of fuel system of buses into CNG along with installation of catalytic converters	1,000 buses completed, conversion of another 2,000 is planned for the year 2003-04	
Conversion of fuel system of buses unto LPG	Cancelled	Not feasible
Conversion of fuel system of diesel mini-buses into CNG	Not yet started	Prior to project implementation, an increase in the number of CNG stations, to 15 from the current 4, in Teheran is planned within 2 years.
Increasing of Light-Rail transportation system	Under research	Lack of technical expertise and budget.
Increase of Metro lines	Extension of Line 2 is under construction and new lines are under technical survey by Teheran Metro.	Time constraints and lack of budget.

(4) Fourth Field: Fuel

Objectives:	This field aims to improve fuel quality, reduction of fuel consumption, and substitution by cleaner fuels, since almost all-urban air pollution arises from the consumption of fossil fuels. Ministry of Oil (MOO) intends to substitute fuel in public motor vehicles in Tehran. It estimates a reduction of pollutants within 10 years, based on the research.
Projects:	Sound utilization of fuels, improvement of fuel quality, substituting with gas
Implementing Org.:	MOO, MOI

Table G.4 Progress up to January 2004: Fuel

Major Projects	Progress and Status	Obstacles/Comments
Distribution of unleaded gasoline	Completed in Teheran in 2002 and the whole country in 2003	
Sulfur removal from diesel	Distribution of low sulfur diesel fuel exclusively for Tehran United Bus Company started in 2002	It requires significant enough changes in pipelines and instruments of refineries that expansion of targets is difficult.
Substituting with gas	Measures were taken under Field Three	

(5) Fifth Field: Technical Inspection and Maintenance Program

Objectives: Technical inspection of motor vehicles will reduce emissions, control quality and safety of vehicles, reduce accidents, and also create possibilities for development public education to reduce fuel consumption.
Therefore, this field aims to enhance the technical inspection and maintenance functions. The major part of this field is the facilitation of inspection and maintenance centers. It estimates an annual reduction of 15% (438 million liters of gasoline) in fuel consumption in the city of Tehran and emissions from vehicles is expected to decrease in the first 5 years.

Projects: Implementation of technical and maintenance program and establishment of inspection and maintenance centers for private cars, heavy vehicles, and motorbikes.

Implementing Org.: Municipality of Teheran, Traffic Police

Table G.5 Progress up to January 2004: Technical Inspection and Maintenance Program

Major Projects	Progress and Status	Obstacles/Comments
Implementation of technical and maintenance program (dissemination program) of inspection centers	Executed by the Triplet Committee	Triplet Committee is formed by Traffic Police, DOE, and Municipality of Teheran (including Inspection Bureau).
Establishment of inspection centers	6 centers started operations in 2002	
Establishment of inspection centers for heavy vehicles	Not yet started	
Establishment of inspection centers for motorbike	Has been performed in some centers	Inspections for motorbikes is not mandatory.
Introduction of parts quality control system	Not yet started	It will be performed by Inspection Standards of Productions Institute.

(6) Sixth Field: Traffic Management

Objectives: This field aims at smoothing traffic flow and reducing pollutants from mobile sources. It estimates the reduction of emissions from vehicles through the installation of park-meters. Also, SO_2 emissions will decrease by 190 ton/year and about 5,000 liters of fuel will be saved per day by installation of each intelligent traffic light.

Projects: Implementation of parking management policy, installation of traffic lights.

Implementing Org.: Municipality of Teheran, Traffic Police

Table G.6 Progress up to January 2004: Traffic Management

Major Projects	Progress and Status	Obstacles/Comments
Implementation of parking and park-meters management policy	On-going	Control and supervision of installed meters require cooperative management measures.
Installation of intelligent lights and green lines	400 junctions are completed	Technical and financial problems exists for some parts of Tehran.

(7) Seventh Field: Education

Objectives: This field aims to enhance the technical capacity of technicians, engineers, and police through training and to increase public awareness concerning reduction of air pollution through educational programs. If the technical vehicle inspection and removal of technical failures are performed by skilled and experienced technicians in conjunction with full cooperation of people through sound fueling and driving, it is expected that air pollution in Tehran can be reduced by 20%.

Projects: Training of technicians and repairmen in inspection centers, training of technicians on Scientific-Applied basis, training of traffic police, public education.

Implementing Org.: Municipality of Teheran, Traffic Police, Ministry of Higher Education, IRIB (Islamic Republic of Iran Broadcasting), DOE

Table G.7 Progress up to January 2004: Education

Major Projects	Progress and Status	Obstacles/Comments
Training of technicians and repairmen in inspection centers	Completed	Performed as internal training.
Basic education for vehicle producers and repair-technicians	Slow progress	Requires cooperation of Municipality and industry
Training of Traffic Police	Police Academy was established in 2002	Requires traffic management subjects.
General Public Education	Establishment of General Education Committee, organizing annual Clean Air Day, information and brochures were disseminated	Committee was formed by IRIB, DOE, Police, Tehran Traffic and Transport Organization (TTTO) etc., still requires cooperation and coordination among stakeholders.

G3 Review of Current Action Plan Progress

(1) First Field: New Motor Vehicles

ECER 83 for domestically produced light vehicles was successfully implemented at the end of June 2003, earlier than the original target year of 2005. One of the reasons for the success is that car manufacturing and related companies took this issue seriously and had adequate technical backgrounds.

However, procedures of observance for ECER 83 emission standards are not clear. The observance of standards is supposed to be conducted under the cooperative institution formed by the Environmental Agency, the Ministry of Industry and Mining (MOIM), and Inspection Standard of Production (under MOIM). However, according to an interview with the DOE in 2002, the current observance test is only performed at SAIPA . Neither the Environment Agency nor the Ministry of Industries and Mining is equipped with testing machines. Thus, the establishment of a Coordination Committee among related organizations is suggested in order to clarify the roles of related ministries to secure the observance of emission standards.

Regarding heavy vehicles, the implementation of EU2000 for heavy vehicles would take a considerable effort on the side of manufacturers because, in spite of the fact that heavy vehicles manufactured in Iran are of many models and with a variety of engine types, current measures for diesel vehicles adopted in the Ten-Year Action Plan seem to have been determined without much attention to the technical capability of manufacturers. For example, to meet the standards, vehicles manufactured with technology imported from Mercedes-Benz in the 1970s would have to have their engines redesigned. It would require considerable research work for such vehicles to comply with the target standards. Thus, it is recommended that the capability of heavy vehicle manufacturers in Iran be assessed so that a feasible schedule for implementation of stricter standards can be determined with a reasonable lead-time.

As far as CO and HC are concerned, much attention is not required at the present time because the overall contribution of diesel engine vehicles to air pollution is small. Even though the displacement volume of diesel engines tends to be large, emissions of these pollutants by diesel

engines is on the order of one tenth of that produced by gasoline engines. However, diesel engines emit larger amounts of NOx, PM, and SOx. Regarding SOx, it is appropriate to take measures to reduce the sulphur content of fuel oil, rather than measures to prohibit SOx from diesel vehicles.

Considering the fact that even Europe, the U.S.A., and Japan recently regulated SOx levels to under 50ppm, the current regulation of 500ppm or less in Iran is acceptable at present. Regarding NOx, there is no single prominent technical solution against NOx emission by diesel engines, so it would not be too late for Iran to determine measures to be taken after seeing how technical developments in other countries evolve.

It seems difficult to implement emission reduction measures for motorbikes because not all of the 100 production companies in Iran are technically and financially capable of cooperating with various measures without governmental support. Thus, it is suggested that a strong link should be created between the motorbike industry and implementing organizations to formulate feasible schemes in order that the large number of production companies be technically and financially capable of implementing emission reduction measures.

Though ECER 49 for imported mini-buses has not yet been implemented, not too much attention is required because there are actually few imported mini buses due to the significantly high import taxes imposed.

(2) Second Field: Used Vehicles

Regarding the conversion to CNG for buses, application of spark ignition systems instead of dual fuel (CNG and Diesel oil) engines may spoil the flexibility of the plan. While the spark ignition system is also required to establish a significant number of CNG stations, the dual engine can be operated on gasoline in case of a CNG shortage by automatically switching to gasoline engines. Considering the limited number of existing CNG stations in Teheran, it may require more than 10 years to develop an adequate number of CNG stations for the spark ignition system to be completely implemented. Thus, the introduction of dual fuel engines is suggested to give the plan more flexibility.

The conversion of fuel supply system of Peykan over 10 years old is not in progress due to the unclear roles of related organizations and a lack of strong initiative, although a technical solution has practically been identified. According to laboratory tests conducted by Iran Khodro Power Train Company (IPCO), under contract with Iran Fuel Conservation Organization (IFCO), the conversion system by remodeled vertical type carburetor took priority over the system by injection type in terms of cost performance. As the retro fitting project had not been implemented yet, the JICA Study Team conducted Pilot Project 4 (PP4) to determine the bottleneck of the project. In line with technical solutions, it is ultimately necessary to impose a regulation, like one practiced in 8 municipalities in Japan to promote the conversion[1], that old cars cannot be operated without emission control devices.

In addition, it is worth considering measures against CO emissions that are produced by idling engines of used gasoline vehicles. Benefits of such measures will be expected because there is severe traffic congestion in Tehran.

[1] http://www2.kankyo.metro.tokyo.jp/jidousya/diesel/index.htm (in Japanese)

(3) Third Field: Public Transportation

Domestic factories, such as Iran Khodro Diesel and Shahab Khodro, with the technical capabilities and required budgets have planned and produced buses using CNG. Iran-Khodro diesel planned to produce 200 CNG buses by 19 January 2004 (Clean Air Day), and 550 buses by the 19 February 2004. Though delivery has not yet been made, Shahab-Khodro has produced 100 CNG buses. The budget required for production of 1,000 CNG buses has been allocated through the Office of the President of the Republic.

According to the information from Teheran Metro, Lines 1, 2, and 5 are in operation out of a planned ten metro lines and Lines 1, 2, 3, and 4 were prioritized for Teheran City's internal transportation[2]. Based on these priorities, the extension of Lines 1 and 2 is under construction. Two stations on the Line 2 will be in operation before the end of this winter. Lines 3 and 4 will be constructed after the completion of Lines 1 and 2, which are beyond the Ten-Year Action Plan period.

(4) Fourth Field: Fuel

As already mentioned in the Second field, the conversion to CNG may face difficulties because of the adoption of the spark ignition system, which requires a significant number of CNG stations. On the other hand, in the case of taxies, there seems to be progress in the conversion. The success depends on the adoption of the dual fuel (gasoline and LPG) system because the system is workable for spark ignition engines and LPG is provided free of charge in Tehran.

(5) Fifth Field: Technical Inspection and Maintenance Program

Physical facilities have been established and the overall system at inspection centers appears to be adequate and in good order. MOT had established six fully automated technical inspection centers for cars by the March 2002 and all are in operation. (Another is to be added by February 2004) The total capacity of the inspection centers is approximately 3,000 per day. According to the Executive Committee meeting on Jan. 2002, necessary coordination has been made between DOE, MOT, and the traffic police for obliging all passenger cars to obtain permits from these centers. These are notable achievements of the Action Plan.

However, there are problems with operating rates, capacities, human resources development of technicians, and engineering in workshops of the centers. The first problem is the low utilization rate. Many vehicle users do not come and receive inspection. Though 109,781 passenger cars were inspected in the centers during the year 1381 of Iranian calendar, the operating rate stood at a low level of about 20%. To cope with this issue, the JICA Study Team has been implementing Pilot Project 5 (PP5) for the promotion of vehicle inspection especially among owners of older vehicles, which are considered to be the major polluters. In addition, on the initiative of the Iranian government, fines for driving vehicles that had not passed inspection were increased from 10,000 rials to 50,000 rials in November 2002 and the number of traffic police will be increased to strengthen law enforcement after the consultation between Tehran Vehicle Technical Inspection Bureau (TVTIB) and Traffic Police. In spite of these efforts, it is necessary to further consider combined measures of strict law enforcement and financial incentives and joint public campaigns among TVTIB, the Traffic Police, and repair-shops, to increase operation rates.

Second, the total capacity of the six existing inspection centers would not meet demand if all vehicles came to receive inspection; twice as many inspection centers would be required. Thus,

[2] http://www.tehranmetro.com/

it is also necessary to consider the feasibility of a system of private inspection centers, under an adequate certification procedure such as one operated in Japan.

Third, another issue is whether there is greater benefit in maintaining and enhancing the technical skills of workshops, rather than encouraging vehicle inspection in the centers, which falls under field seven (Education). Though the workshops have played a role in providing "quick service" to passenger cars that fail to pass the first inspection tests, up to now there have been no periodic opportunities to train technicians and engineers of workshops. On the other hand, technicians responsible for vehicle inspection have internally received technical transfer from their colleagues. Five technicians were sent to Germany in 2002 to learn the operation of inspection machines. Thus, to cope with this issue, the JICA Study Team has undertaken the training program for inspection centers technicians and engineers of repair shops as Pilot Project 6 (PP6). PP6 has reviewed the effectiveness of internal training programs and identified tasks to institutionalize the process of internal training in the centers.

(6) Sixth Field: Traffic Management

Following the approval of the Cabinet, MOT called for a tender for equipping junctions and streets with intelligent traffic lights (at least 300 junctions) in January 2002 and installation of park-meters was in its final stage. Moreover, with the cooperation of TTTO, major actions have been taken for smoothing traffic flows and geometric improvement of streets and passages (According to the Executive Committee meeting in Jan. 2002).

Traffic High Council and TTTO mobilized a budget of 9,690 Million Rial for the installation of intelligent traffic lights and 1,500 Million Rial for park-meters for fiscal year 2003. The constraint of installation of intelligent traffic lights and park-meters is the financial provision, for which TTTO is applying for a low interest loan. It will not be released unless an agreement is reached between Congress and the bank.

In order to implement the traffic management measures, it is necessary to build the capacity of the traffic police, which is discussed under field seven (Education). According to the current status of the project, the Police Academy was established in 2002. Presently, traffic engineering is the main subject of the Academy and traffic management has not been taught. In general, high-level scientists give lectures in this Academy and about 20 lectures are presented during a year. The period of the training course is 2 semesters per year. The options that are being used for improving the quality of the training course are as follows:

- Participation in specialized congresses by trainees;
- Participation in training workshops by trainees;
- Visits to traffic and transportation organizations and bureaus by trainees;
- Visit to technical inspection centers by trainees; and
- Visits to vehicle industries by trainees.

Including programs for traffic management in the Police Academy is strongly recommended.

(7) Seventh Field: Education

One of the on-going programs to enhance public awareness is the monitoring of air pollution in Tehran by the Executive Committee with the cooperation of the Tehran Province Environmental Directorate. Tehran municipal center presents daily air pollution conditions according to related standards as well as Pollution Standard Index (PSI).

Another action for public awareness was to organize a meeting in Tehran with the participation of environmental specialists and city managers in June 2000.

Holding Clean Air Day annually since February 1997 has been another important educational activity of the Committee. This event was held on 19th January 2004 this year with the cooperation of all related organization and NGOs and other interested parties. The main event, targeting children and teenagers in an effort to improve their environmental awareness, took place at MOI. Other activities this year include a National Cycling Tour from 28 cities to Teheran to hold educational programs, a workshop for NGOs, implementation of campaigns by car producers with cooperation of the Municipality of Teheran, the opening of two gas stations, the planting of about 29,000 trees in the city, and free of charge vehicle tune-ups by private maintenance centers.

As implemented at this year's Clean Air Day, targeting children and youth is one of the measures to increase awareness expected to influence parents and other adults. However, this process requires time for effectiveness of public awareness activities to be apparent and repeated efforts are needed. While implementing these ceremonial activities, it may be suggested to deliver Action Plan oriented activities, which support the implementation of concrete measures to improve the air quality, such as promotion of car replacement, enhancement of vehicle inspection and maintenance, and increase of public transportation use.

The only outstanding project that requires coordination efforts to realize implementation is that regarding basic education for vehicle producers and repair-technicians. As stated in the progress report, both the Municipality of Teheran and producers need to cooperate on this subject. It is suggested that a special unit for project implementation and statistics planning be formulated as a first step. They may also call for assistance to other related organizations once a plan to utilize resources is decided upon.

Among the other projects under Field Seven, both the training of Traffic Police and inspection centers are in progress. Recommendations for the provision of further training were already mentioned in the Fifth and Sixth Fields respectively.

Appendix H General Recommendations for Strengthening Air Quality Monitoring System and Its Use

In this section general recommendations are provided without specific measures as part of the MAP. A major project funded by the World Bank has been initiated by which the number of monitoring stations is to be more than doubled and capacity building for monitoring is also to accompany the increased number of monitoring stations. At this stage, however, details of the project are not known. Therefore, it was decided by the Study Team that no specific measures be proposed in the MAP for monitoring in order to avoid the waste of a duplicated effort.

H1 Strengthening in Monitoring System

(1) Well-maintained Equipment

11 air quality monitoring stations that are capable of continuously measuring more than one type of pollutant have been installed in the GTA. Four of these are operated by Air Quality Control Company (AQCC) and the rest by the DOE Provincial Laboratory. These stations are expected to conduct completely continuous monitoring throughout the year, fully 8,760 hours (except in leap years, which have 8,784 hours) without intermission. However, some stations failed in achieving more than 6,000 hours of monitoring, as prescribed in the Guidelines for Annual Evaluation issued by DOE-Tehran. The table below shows the number of stations that achieved more than 6,000 hours of monitoring in 1381 (Iran).

Table H.1 Number of Monitoring Stations Exceeding 6,000 Hours of Monitoring

Item	Number of Stations*	
	achieved 6,000 hrs	serving for the item
NO_2	9	10
CO	10	10
PM/Dust	7	10
SO_2	5	8

* Counted in 10 stations; Mehrabad station is out of this count

For the monitoring of CO and PM/Dust, a considerable number of stations achieved more than 6,000 hours of monitoring, however, performance was worse for NO_2 and SO_2. These figures suggest the reliability of monitoring is still at an insufficient level. Furthermore, the total monitoring hours of 6,000 is the minimum level for annual evaluation, so stations should pursue a much higher level of annual operating time.

The interruption of monitoring is caused by the lack of spare parts when they are needed. In many cases these can apparently be foreseen in advance and avoided by providing an appropriate budget to the laboratory. The solution for steadier monitoring is no doubt to allocate sufficient budget through top-level initiative in DOE.

(2) Well-trained Staff for Operation

Another factor concerning reliability of monitoring data lies in the quality of data. Even if a station provides sufficient hours of monitoring, errors in process during operation disturbs accurate evaluation of air quality. Besides the major reasons of interruption stated above, other defective manners of operation also cause unreliable data. Results of defective operation are

automatically notified to operating staff as concentrations of abnormal figures; however, the staff does not always take necessary measures to recover normal function of equipment. Abnormal situation of operation are observed in the following cases:

1. Negative concentration;
2. Empty data;
3. Sudden and long-lasting extraordinarily high figures; and
4. Unusual hourly and daily fluctuations.

These kinds of emergency cases need quick responses for remedial measures by operating staff watching the monitoring screen, at least in the daytime. Staff members are required to be aware of emergency cases appearing on the monitoring screen and to keep equipment in sound condition. Staff of DOE Central Laboratory are not sufficiently trained to resume normal functioning of the monitoring equipment by themselves, so they hardly seem aware of emergency cases appearing on the monitoring screens. This makes it difficult for them to take prompt action.

The priority for upgrading capacity of operating staff should be placed on the improvement of their current skills and enhancement of knowledge about monitoring technology. In this regard the guides for staff training are contained in sections of the MAP related to capacity building of DOE staff and recruiting (MAP A1-5 and A1-6). In addition to training inside the agencies conducting air quality monitoring, proper employment of external human resources should be considered. The DOE Central Laboratory did qualify a number of companies for monitoring of pollution in industries. They are regarded as supporting sources of manpower for complete operation of monitoring equipment.

Regarding eligible sources of manpower, staff of the laboratory should have an educational background in either chemical, physical, or electrical engineering or some other field closely related to the monitoring operations. This background requirement should be considered by those staff members responsible for creating training programs. Provided that the existing staff does not satisfy the requirement, some reinforcement of staff in number will be necessary for sustainable operation of monitoring with sufficient quality. In addition, principal staff members besides the director should have a masters degree in their field of specialization in order to serve the needs of analysis and planning strategic use of monitoring system.

(3) Reasonable Location of Monitoring Stations

The principal purpose of monitoring network is to know the overall situation of air quality in GTA. Presently the monitoring stations are not suitably located for that purpose. Out of 9 stations, 4 are placed beside the trunk roads with heavy traffic or surrounded by buildings. These are classified as roadside stations and are representative of the peak value of air quality around the stations and not the average in the surrounding areas. To improve the monitoring network in terms of representativeness of average air quality, it is recommended that roadside stations be relocated to locations away from busy roads or areas with stagnant air. As the number of stations is increased, the location of new stations should be selected taking this point into consideration.

H2 Strengthening in Utilization of Monitoring Output

(1) Strengthening in Data Processing and Analysis

Discrimination of data by quality is the first step in data processing; however, DOE staff members are still improving in their ability to handle abnormal outputs. Steps have been taken within DOE, under the guidance of a resident JICA expert, toward establishing and authorized or unified manner of screening abnormal data. The next step in data processing is statistical analysis for comparison to environmental standards. In connection to this, WG2 submitted a recommendation letter to DOE in December 2003 that included a proposal on guidelines for statistical handling of monitoring data focusing on:

1. Introduction of Required Monitoring Hours for validation of data set;
2. Definition of a Daily Average for SO_2 and Dust C and a 98 percentile value for SO_2, Dust C and CO; and
3. Definition of the Representative Value for the 8-hour average for CO as from 4:00 p.m. to 12:00 p.m.

As the required monitoring hours for validity, the following criteria were proposed:

1. Validity of monitoring station: 6,000 hours/year;
2. Validity of daily average for Dust and SO_2: 20 hours/day; and
3. Validity of 8-hour average for CO: 8 hours/16:00-24:00.

The third step in data processing is analysis of pollution mechanism taking meteorological conditions and emission sources into consideration. AQCC has been carrying out the calculation of PSI everyday for 22 zones based on their daily monitoring output. In the DOE's Central Laboratory a system of analyzing data at individual stations with graphic display has been installed and put into operation. Analysis should be expanded from examining the mechanism of pollution at specific stations to examining pollution mechanism in the entire area of GTA with the outputs of all the stations. To execute this wide analysis requires a comprehensive training course for eligible staff of the DOE Laboratory, as assumed in the relevant MAP A2-1.

(2) Long-term Evaluation of Air Quality

Daily output of air quality is at first used for short-term forecasts of air pollution in combination with meteorological data. The forecast is announced to relevant authorities and the public through direct facsimile service and through the mass media as part of fixed time news programs. The air pollution forecast service is jointly operated by four agencies: AQCC, DOE, MOH, and the Meteorological Organization. As for the use of data for long-term evaluation of air quality, DOE uses the data to publish an annual report on air quality. The publication is circulated mainly in government organizations and not disclosed to the public. Circulation of the annual report on air quality will contribute much to promoting public awareness of air pollution control, though DOE is at present not active in doing so. It is therefore recommended that dissemination of the publication be considered to a wider range of recipients outside DOE and relevant MAPs (A1-3 and D-1) are prepared to accelerate these efforts.

For the use of monitoring data for long-term air quality evaluation, the focus lies in annual fluctuations of average concentrations by district and by item. The trends in these concentrations should be examined together with the transition of pollution sources in view of amount and location. This examination may enable the evaluation of pollution control measures so far executed and consequently assist in formulation of further steps pollution control efforts. The

accumulated efforts toward emission reduction are in principle reflected in emission inventories for mobile and stationary sources. This means that simultaneous actions for completing emission inventories and annual reports on air quality are requested to promote pollution control with reasonable focusing points. These actions will be supported through the relevant MAP A2-1.

(3) Stimulation of Research Activity in Air Pollution Control

To facilitate circulation of the air quality monitoring report, the reliability of the report must first be secured. In the course of upgrading monitoring activities, it is recommended that DOE organize a committee to adopt knowledge of learned persons outside DOE and have periodical meetings. The activities of this committee would help DOE in improving monitoring activities and also contribute to universities and other relevant institutions in encouraging research activity by providing subjects of national interest. Activities that are considered effective to cooperate with the committee include:

1. Review and qualify annual report based on the guidelines;
2. Advise DOE Laboratories on any aspects of monitoring and analysis;
3. Disseminate annual monitoring report and data; and
4. Dispatch intern students to DOE Laboratory as part of educational programs.

Assumed members of the committee could be invited from the following authorities and sources:

1. DOE (Air Pollution Directorate) as chief;
2. DOE (Central Labo. and Tehran Provincial Labo.);
3. MOH;
4. Meteorological Organization; and
5. Learned individuals in relevant fields.

Appendix I Details of Individual MAP Measures

List of Priority MAP Measures

The following is a list of priority MAP measures that was mentioned in Chapter 5.

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

The following shows details of each priority MAP measure compiled based on the logical framework that was introduced in Chapter 5.

Table I.1 Creating an Advisory Committee for the Environmental White Paper in Tehran Province (A-3)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from both Mobile and Stationary Sources

Objectives:

Through Pilot Project 3 (PP3, White Paper) undertaken during the second year, a good amount of experience has been acquired. In the third year, on this basis, PP3 should be extended in two directions (i) to expand the coverage of the White Paper to include all environmental issues, such as water pollution, waste disposal, nature conservation and global environmental issues, such as ozone layer depletion, global warming, and biodiversity and (ii) to make a study toward institutionalizing an Environmental White Paper in the province. DOE-TPD should be in charge of this project, and it is expected to accomplish the above two goals by setting up an Advisory Committee on the White Paper for the Director General (Mr. Pirasteh) of DOE-TPD. The Advisory Committee on the White Paper should be designed and steered so that the knowledge and experience of the private sector is properly cultivated in order to enhance the cooperation system between the public and the private sector. The Committee will also be requested to show its views regarding the draft of the coming year's White Paper, and to make a report as to the following matters in line with the above two directions:

1. The index of the prototype White Paper that covers all environmental issues
2. Coordination process (clarification of the drafting office or the organization, Executive Committee's role, to whom the White Paper is to be presented for authorization, etc.)
3. The manner to institutionalize the White Paper, making clear the scope of relevant organizations, and their obligation to make contributions to the White Paper
4. Budget and personnel matters necessary to complete the White Paper
5. Other relevant matters

Main Implementing Organization and Its Responsibilities:

DOE-TPD, which also assumes the responsibility to steer the Advisory Committee on the White Paper

Related Implementing Organizations and Their Responsibilities:

Ministry of Health (MOH), Ministry of Industry, Ministry of Meteorology, Ministry of Transportation, MOT, etc. should cooperate with DOE-TPD through the management of the Advisory Committee regarding their policy explanation, presentation of relevant data, etc.

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations

The Advisory Committee on the White Paper consists of delegates of NGOs, scholars, journalist or other experts in the private sector, and, if the need arises, governmental officials of related Ministries. Other proper persons may be invited to the meeting as appropriate.

II. Fund, equipment, and technology

Payment to the Committee members, communication costs, expenses to hold meetings, the payment to the special guest for his presentation, costs for printing the report, translation cost for needed documents into English in addition to that of the report into Farsi, etc.

III. Laws and regulations

Relevant laws, like the Second and Third Economic, Social, and Cultural Development Plan Law, in English and in Farsi (accurate translation might be needed for more laws).

Processes:
The Advisory Committee on the White Paper should be organized under the control of the Director General of the DOE-TPD by the delegates of NGOs, scholars, or other selected experts in the private sector as well as the related governmental officials who were involved in the White Paper project in the second year. Executive Committee should be kept informed as appropriate as for the progress of the Advisory Committee.

Required Human Resource:
A consulting firm to research, prepare meeting documents on outcomes of said research, arrange meeting places for the Committee, keep the minutes of the meetings, and produce the draft of the final report.

Human Resources Development:
Capability for coordination on varieties of subjects with governmental offices and NGOs or other persons or organizations in the private sector.

Items to be Budgeted: See II above.

Expected Outcome:
The conclusion of the report could be materialized in the laws and/or regulations as appropriate. A good precedent for the cooperation system between the government and the private sector would be established.

Implementing Schedule:
The report on institutionalizing the Environmental White Paper, that covers all of the above-mentioned subjects, should be completed by the end of February 2005.

Cost-Benefit Ratio:
Relatively small cost could make a good precedent in enhancing the environmental management system.

Table I.2 Expansion of the Executive Committee Executive Committee Secretariat (A1-1)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Both Mobile and Stationary Sources

Objectives:
1. To attach a secretariat with capacity for pre-coordination among various agencies to the Executive Committee, established for the purpose of supervising the implementation of the Ten-Year Action Plan so that the coordination ability of the Executive Committee can be enhanced.
2. To attach a secretariat with capacity for formulating policies and measures to the Executive Committee so that the problem solving ability of the Executive Committee can be enhanced.

Main Implementing Organization and its Responsibilities:
Executive Committee Secretariat: preparation of Executive Committee agenda, pre-meeting coordination, analysis of issues, preparation of solution proposals, monitoring of implementation status, assistance in implementation, securing of operational budget, operational directive preparation, and evaluation.

Related Implementing Organizations and their Responsibilities:
Member organizations of Executive Committee: cooperation with the secretariat, participation in its operation, provision of data and information, provision of monitoring results.

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
   1. Establishment of legal status of the secretariat
   2. Appointment of experts with course experience in project management techniques
   3. Appointment of experts in problem solving
   4. Establishment of channels for information exchange between the secretariat and the Executive Committee member organizations
   5. Implementation of public relations activities by the secretariat

II. Fund, equipment, and technology
   1. Appropriation of a budget for the secretariat
   2. Establishment of an office for the secretariat
   3. Operation of a database for records of discussions in the Executive Committee
   4. Equipment (PC, software)

III. Laws and regulations
   Establishment of legal founding of the secretariat, updating of data and information

Processes:

1. Definition of legal status, roles, and responsibilities
2. Determination of information exchange with various agencies
3. Determination of methods of requests from agencies to the secretariat
4. Determination of methods of coordination with agencies
5. Appointment of the director of the secretariat
6. Appointments of officers
7. Establishment of routine work processes (including making records of meeting into a database and distribution of its contents)
8. Establishment of non-routine work processing methods (including requests from agencies for problem analysis and research)
9. Implementation and monitoring

Required Human Resource:

Project manager, project management techniques expert, policy expert

Human Resources Development:

Training in project management and policy analysis

Items to be Budgeted:

1. Cost of office preparation
2. Training cost
3. PC and project management software

Expected Outcome:

1. Enhanced coordination function of the Executive Committee
2. Enhanced project monitoring and management capability of the Executive Committee
3. Enhanced problem solving capability of the Executive Committee

Implementing Schedule:

1. Selection of staff
2. Preparation of the office
3. Establishment of legal founding of the secretariat
4. Holding of the Executive Committee (every other Monday)
5. Issuing of records of meetings (after every meeting)
6. Monitoring and evaluation

Cost-Benefit Ratio:
The secretariat can greatly expedite the work of the Executive Committee, such as the implementation of the Ten-Year Action Plan and MAP by means of promotion of project implementation, promotion of goal management, and elimination of conflict and duplication of work between different agencies resulting in a quantum jump in the efficiency of the Executive Committee. It requires only personnel costs and its cost-benefit ratio would be quite high.

Table I.3 Introduction of Management Information System to the Executive Committee (A1-2)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from both Mobile and Stationary Sources

Objectives:
1. To introduce a computerized MIS to the EC Secretariat that centrally compiles and analyzes information, such as status of implementation of the Ten-Year Action Plan, which has been held separately by each of implementing agencies to present, so that inter-agency coordination can be executed smoothly and projects can be expedited.
2. To introduce a computerized database of pollutant emissions, by emission sources and by area, to the EC Secretariat, information that is currently dispersed among various agencies, making it impossible to accurately obtain the overall picture, so that pollutant emission reduction can be made against quantitative targets.

Main Implementing Organization and its Responsibilities:
Executive Committee Secretariat: System Introduction, maintenance, data collection, data analysis, analysis results reporting, securing of budget, operation directives, evaluation

Related Implementing Organizations and their Responsibilities:
Member Organizations of the Executive Committee: Cooperation in secretariat operations, participation in secretariat operations, provision of data and information, provision of results of monitoring

Measures to Achieve the Objectives:
I. Institutional, human resource, and public relations
   1. Appointment of MIS experts to the secretariat
   2. Establishment of methods of reporting of MIS output and public relations

II. Fund, equipment and technology
   1. Budget for personnel cost
   2. Equipment procurement (PC, software)

III. Laws and regulations
   Establishment of regular updating of data

Processes:
1. Definition of legal standing, roles, and rights of the EC Secretariat
2. Determination of necessary information and data from each of the concerned organizations
3. Systemizing of data updating and communication to the EC Secretariat from concerned organizations
4. Determination of output format, reporting routing, and frequency
5. Determination of formalities of coordination with concerned organizations
6. System operation
7. Monitoring and feedback

Required Human Resource:
Project manager, project management expert

Human Resources Development:
Training in project management and project management software

Items to be Budgeted:
1. Cost of training
2. PC and project management software

Expected Outcome: the Executive Committee should realize:
1. Enhanced capability in inter-agency coordination
2. Enhanced capability in project implementation management
3. Enhanced capability in problem solving

Implementing Schedule:
1. Appointment of secretariat staff
2. Determination of legal standing of the secretariat
3. Staff training in project management software (2 weeks)
4. Staff training in project management (OJT (on-the-job training))
5. Collection of schedules and milestones of the components of the Ten-Year Action Plan and the MAP, and data input into MIS (2 months)
6. Analysis and evaluation of implementation status of action plan components
7. Analysis and evaluation of component projects by the Executive Committee as a whole

Cost-Benefit Ratio:
A very high cost-benefit value can be expected.

Table I.4 Inventory Database Establishment in DOE for the Emission from Stationary and Mobile Sources in GTA (A2-1)

Ultimate Goal: Reduction of Air Pollution

Medium Level Goal: Reduced Pollutants from Both Mobile and Stationary Sources

Objectives:
To establish the Inventory Database in DOE-TPD for the emission gases from Stationary and Mobile sources as a basis to work out a policy for the management of the air quality in GTA by DOE and other related organizations.

Main Implementing Organization and its Responsibilities:
Division of Information Center in DOE-TPD ------ (Provisional)
1. Data collection of energy, fuel and emission gases from stationary and mobile sources, and storage of updated inventory Database
2. Supply of data and information to related organizations
3. Comments and advice to emission sources on the management of operation and maintenance, and policy suggestion to related organizations at Executive Committee
4. Simulation of air quality and forecast of improvement
5. Preparation of policy for the improvement of air pollution prevention

Related Implementing Organizations and their Responsibilities:
1. Mobile emission sources: Ministry of Traffic and Transport (MOTT), MOT, TTTO, Tehran Traffic and Transportation Company (TTTC), Tehran Comprehensive Transportation and Traffic Studies (TCTTS), Meteorological Agency (MOM), IFCO, AQCC, etc.
2. Stationary emission sources: Ministry of Energy (MOE), MOIM, National Iranian Oil Company (NIOC), MOI, National Petrochemical Company (NPC), MOH, MOTT, MOM, and their subsidiaries, etc.
3. Responsibility:
   a. Cooperation of data and information supply to DOE
   b. Legislation and enforcement for reporting on the emission gases from factories and facilities and improvement of facilities and operations to follow the regulations against air pollution.

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
   1. Capacity Building for DOE department in charge of Inventory Database
   2. Assignment of Task Force Team in DOE for the implementation and establishment of Inventory Database
   3. Expert training in database management
   4. Subcontracting Service to Local Consultant
      a. Data Collection and Analysis for database installation
         For the completion of Inventory Database in DOE, continuous data collection in succession to previous service of Pilot Project 1 (PP1) in 2003 is required.
      b. Improvement of IT System in DOE
         For the sustainable maintenance of Inventory Database in DOE, improvement of IT System is required for efficient data collection, analysis, and supply between DOE and related organizations and emission sources.

II. Fund, equipment and technology
   1. Development of facilities in the DOE department responsible for the Inventory Database.
      a. Introduction of software for the management of the database
         - Microsoft Access 2002
         - Arcview GIS, ESRI, and Spatial Analyst
         - Air Quality Simulation (Air Viro)
      b. Improvement of computer systems
         - Desktop Computer - 7 (2 for Training)
         - Notebook type PC - 5
         - Printer (A3 Color) - 2
         - Plotter (A0)- 1
         - Copy machine - 1
         - Office furniture
   2. Fund
      a. DOE's own budget
      b. National project fund (4th 5 year National Plan etc.)
      c. International Cooperation Fund

III. Laws and regulations
   Legislation of the Act for the reporting of energy and fuel consumption and emission rate to DOE from major stationary sources and their related organizations

Required Human Resource:

1. Task Force Team in DOE
   a. PM - 1
   b. Senior Project coordinator - 1
   c. Chief System engineer - 1
   d. Chief Chemical engineer - 1
   e. Chief Mechanical engineer - 1
   f. Computer operator (Database and GIS) - 2
   g. Assistant engineer (mechanical and chemical) - 5
2. Consultants
   a. Project management coordinator (plant and facilities) - 1 18 MM
   b. Expert of Database management for mobile emission - 1 6 MM
   c. Expert of IT system development - 1 6 MM
3. DOE Counterpart to assist JICA Experts
   a. Mechanical engineer - 1 36 MM
   b. Chemical engineer - 1 36 MM

Human Resources Development:

1. Training for computer program

a. ACCESS (Database design)
b. GIS
c. Air Quality Simulation (Air Viro)

2. Training for Emission Gas Management
   a. Code and Standard for Control
   b. Study for Stationary Sources
      Fuel Production Process, Emission Combustion Process, Pollutant Gas Properties, Analysis Method, Counter-measures for Mitigation, Heat Conservation, Simulation for Fuel Balance and Emissions in the Future (2009), etc.
   c. Study for Mobile Sources
      Vehicle Engine Combustion Mechanism, Emission Gas Test and Analysis, Catalyst and CNG, Traffic Management, Simulation for Traffic Conditions and Emissions in Future (2009), etc.

Items to be Budgeted:

1. Capacity Building of Information Center in DOE
   a. Task Force Team (Required Human Resource: 1), Counterpart (Required Human Resource: 3)
   b. Computer Software and Hardware (Measures to Achieve the Objectives: II-1-a and b)
2. Training and Education (Human Resources Development: 1 and 2)
3. Subcontract to Local Consultant (Measures to Achieve the Objectives: I-4-a and b)
4. International Consultant (Required Human Resource: 2)

Expected Outcome:

1. List of individual emission sources and information on their operation status in major factories, energy plants, and others by location and road in GIS digital map format.
2. Summary of Energy and Fuel Balance by zone and by type in GTA
3. Estimate of Pollutant Emission Rate by zone, by road, and by type in GTA
4. Forecast of Pollutant Emission by zone, by road, and by type
5. Simulation of Air Quality in collaboration with MOM and Monitoring Center
6. Data supply with responsible organizations for the strategy making for:
   a. Optimal location of fuel filling station and capacity
   b. Traffic management
   c. Energy and fuel distribution
   d. Natural gas distribution and facility plan
   e. Fuel quality improvement
   f. Promotion of energy and heat conservation
   g. Inspection of allowable emission gas from individual source

Implementing Schedule:

3 years from May 2004

Cost-Benefit Ratio:

Contribution to the social benefit by the preparation of an Inventory Database for the Management of Air Pollution Prevention through the fuel conservation, quality improvement and fuel conversion to natural gas etc.

Table I.5 Establishment of Structure for Public Awareness Activities for Action Plans (D-1)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Mobile Sources

Objectives:

To establish the structure of public awareness activities between the main and related implementing organizations in accordance with the implementation of individual MAP measures. It should be noted that all public awareness measures will be performed under individual MAP measures, including:

1. Measures for Used Vehicles;
2. Improvement and Conversion of Fuel;
3. Improvement of Vehicle Inspection;
4. Improvement of Traffic Control; and
5. Enhancement of Public Transport Use.

Main Implementing Organization and its Responsibilities:

The main implementing organization of individual MAP measures will be responsible for formulating plans for public awareness activities and their implementation. These plans should include clear objectives, targets, and methods. It will form an Implementing Unit (IU) with related organizations, and determine the implementing plan together in order to utilize the available resources.

Related Implementing Organizations and their Responsibilities:

Governmental organizations, media, private companies, NGOs, etc., which relate with the individual MAP measure will become members of the IU and provide necessary supports for the implementation of public awareness activities, which will be initiated by the main organization. This includes professional recommendations and information based on expertise and experiences.

Measures to Achieve the Objectives:

I. Institutional, human resources, and public relations
   1. Appointment of experts in project management techniques;
   2. Appointment of experts in public awareness activities; and
   3. Establishment of channels for information exchange between the main implementing organization and related organizations.

II. Fund, equipment, and technology
   1. Appropriation of budget for public awareness activities within the individual MAP measures;
   2. Budget for personnel cost; and
   3. Meeting expenses for IU.

III. Laws and regulations
   Amendment or introduction of new regulations to support the MAP measures.

Processes:

1. Identify and appoint the responsible section/staff for public awareness activities in the main implementing organization and determine the following:
   a. Planning: determine the scope of public awareness activities including clear objectives, targets, media to be used, budget, etc.
   b. Formulation of IU: determine related organizations and the scope of their assistance.
   c. Budgetary planning: securing budget allocation from the individual MAP measure.
2. Determination of the method and its implementation plan with IU members.
   a. Confirmation of methods: targets, media, duration, budgets, etc.
   b. Implementation
   c. Feedback and evaluation: process and measures to be discussed with IU members.

Required Human Resource:

1. Experienced project manager and public awareness experts at main organization.
2. Experienced public awareness experts at related organizations.

Human Resources Development:

1. Technical knowledge transfer from the related organization to main organization.
2. Capacity building of both main and related organizations through implementation, evaluation, and feedback processes.

Items to be Budgeted:

1. Appropriation of public awareness budget within the individual MAP measures.
2. Personnel cost of experts in the main implementing organization.
3. Meeting expenses for IU.

Expected Outcome:

1. Accumulation of know how in the both main and related organizations.
2. Capacity building and creation of a path towards continuous public awareness activities in the main implementation organization.

Implementing Schedule:

In accordance with the implementation of individual MAP measures.

Cost-Benefit Ratio:

The establishment of a structure for public awareness activities to support the individual MAP measures will strengthen the capacity of the respective main organization for further public awareness activities. Furthermore, it will create cooperative links between the main and other related organizations in sharing experiences for avoiding redundancy in public awareness activities in the future.

The following indicates an example of public awareness activities related with individual MAP measures.

Example 1	**Establishment of Structure for Public Awareness Activities for Promotion of Vehicle Replacement MAP**
Ultimate Goal	Improved Air Quality
Medium Level Goal	Reduced Pollutants from Mobile Sources
Measures	Measures for Used Vehicles
Objectives	To establish a structure for public awareness activities to support the promotion of the vehicle replacement MAP under used vehicle measures.
Main Implementing Organization and Its Responsibilities	Manufacture and DOE
	To formulate the IU and perform the public awareness activities to encourage owners of older vehicles to replace their vehicles.
Related Implementing Organizations and Their Responsibilities	Governmental organizations, media, private companies, NGOs, etc., which relate to the individual MAP measure
	To participate in the IU and provide suggestions on the methods and implementation of public awareness activities based on expertise and experiences.

Example 2	**Establishment of Structure for Public Awareness Activities for Promotion of Energy Saving MAP**
Ultimate Goal	Improved Air Quality
Medium Level Goal	Reduced Pollutants from Mobile Sources
Measures	Improvement and Conversion of Fuel
Objectives	To establish a structure for public awareness activities to support the promotion of the energy saving MAP under the Improvement and Conversion of Fuel Measure.
Main Implementing Organization and Its Responsibilities	**MOI and MOO**
	To formulate the IU and perform activities to promote the public awareness on energy saving values on the improvement and conversion of fuel.
Related Implementing Organizations and Their Responsibilities	Governmental organizations, media, private companies, NGOs, etc., which relate to the individual MAP measure.
	To participate in the IU and provide suggestions on the methods and implementation of public awareness activities based on their expertise and experiences.

Example 3	**Establishment of Structure for Public Awareness Activities for Promotion of Vehicle Inspection MAP**
Ultimate Goal	Improved Air Quality
Medium Level Goal	Reduced Pollutants from Mobile Sources
Measures	Improvement of Vehicle Inspection
Objectives	To establish the structure for public awareness activities to support the promotion of the vehicle inspection MAP under the Improvement of Vehicle Inspection Measure.
Main Implementing Organization and Its Responsibilities	TVTIB and Traffic Police
	To formulate the IU and perform activities to promote the public awareness on the importance of vehicle inspection and encourage their spontaneous participation. To establish the tie-up system with the traffic regulation to improve the effectiveness of public awareness activities.
Related Implementing Organizations and Their Responsibilities	Governmental organizations, media, private companies, NGOs, etc., which relate to the individual MAP measure.
	To participate in the IU and provide suggestions on the methods and implementation of public awareness activities based on their expertise and experiences.

Example 4	**Establishment of Structure for Public Awareness Activities for Promotion of Driving Manner Improvement MAP**
Ultimate Goal	Improved Air Quality
Medium Level Goal	Reduced Pollutants from Mobile Sources
Measures	Improvement of Traffic Control
Objectives	To formulate the IU and perform the public awareness activities to promote the driving manner improvement MAP under the Improvement of Traffic Control Measure.
Main Implementing Organization and Its Responsibilities	Teheran Municipality and Traffic Police
	To formulate the IU and perform the public awareness activities to improve driving manners. To gain the public awareness for traffic control in order to contribute to the air quality improvement.

Related Implementing Organizations and Their Responsibilities	Governmental organizations, media, private companies, NGOs, etc., which relate to the individual MAP measure.
	To participate in the IU and provide suggestions on the methods and implementation of public awareness activities based on their expertise and experiences.

Example 5	**Establishment of Structure for Public Awareness Activities for Promotion of Public Transport Use MAP**
Ultimate Goal	Improved Air Quality
Medium Level Goal	Reduced Pollutants from Mobile Sources
Measures	Enhancement of Public Transport Use
Objectives	To formulate the IU and perform the public awareness activities to support the promotion of the public transport use MAP under the Enhancement of Public Transport Use Measures.
Main Implementing Organization and Its Responsibilities	DOE, Teheran Municipality, Bus, and Taxi companies
	To formulate the IU and perform the public awareness activities to improve the knowledge of effectiveness of public transportation use for air quality improvement and to encourage behavior shift.
Related Implementing Organizations and Their Responsibilities	Governmental organizations, media, private companies, NGOs, etc., which relate to the individual MAP measure
	To participate in the IU and provide suggestions on the methods and implementation of public awareness activities based on their expertise and experiences.

Table I.6 Development of a Cross-Ministerial Training Course on Air Pollution Reduction (A1-4)

Ultimate Goal: Improved Air Quality **Medium Level Goal:** Reduced Pollutants from Both Mobile and Stationary Sources
Objectives: 1. To establish a task force which consists of officials in charge of human resources development in organizations related to air pollution reduction 2. To raise policy makers in related organizations' awareness concerning coordinated actions to alleviate air pollution
Main Implementing Organization and its Responsibilities: EEB, DOE Preparation for establishing the task force (membership, roles, and operational directive), employment of an advisor to support drafting the course, preparation of an agenda and recording M/M, drafting the course and identification of lecturers, negotiation with the Management and Planning Organization (MPO) on contents of the course, cost estimates for operating the task force and implementing the course, implementation and evaluation

Related Implementing Organizations and their Responsibilities:

1. Member organizations of the task force: provision of information on current training courses, participation in discussions on contents of the course and evaluation of the course, making policy makers available to attend the course
2. Budget and Organizational Bureau, DOE: securing of funds for operating the task force and implementing the course

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
   1. Establishment of a task force
   2. Employment of an advisor
   3. Development and implementation of the course

II. Fund, equipment and technology
   Budget for an advisor, a task force and the course implementation

III. Laws and regulations
   Establishment of legal founding of a task force, and making the course compulsory for managerial positions in related organizations

Processes:

1. Determination of membership and roles of the task force
2. Preparation of an operational directive for the task force
3. Employment of an advisor
4. Drafting the course through discussions in the task force
5. Negotiation with MPO
6. Securing of funds for course implementation
7. Implementation and evaluation

Required Human Resource:

Task force members (10), advisor (1) to support a task force and lecturers (2), facilitators (3) for group discussions of the course

Items to be Budgeted:

1. Employment cost of an advisor
2. Cost of implementing the course
3. Operation cost of the task force

Expected Outcome:

1. Mechanisms to develop cross-ministerial training courses through the task force on human resources development
2. Cross-ministerial course on air pollution for managerial positions
3. Raised awareness of managers in related organizations concerning coordinated actions

Implementing Schedule:

Establishment of a task force (by May 2004)
Drafting the course (by September 2004)
Negotiation with MPO (by October 2004)
Budget request to MPO (from December 2004)
Implementation and evaluation of the course (during FY2005)

Cost-Benefit Ratio:

Managers will change their attitudes towards coordinated actions by attending the course. Primarily, this requires only costs for task force operation and course implementation. Its cost-benefit ratio would be high in the long term.

Ideas about a Cross-ministerial Training Course:

Duration: 5 days

Qualification: Officials in managerial positions in organizations related to formulating policy to reduce air pollution, such as DOE, MOH, MOIM, MOO, MOT, and the Meteorological Organization

Anticipated number of participants: 21 persons (3 persons/organization)

Training Schedule:

Day	Morning Session	Afternoon Session
First day	Current situation of air pollution in Tehran Progress and obstacles of 10 Year Action Plan	Experiences in other countries (1) (coordinated policies and measures)
Second day	Experiences in other countries (1) (continued)	Experiences in other countries (2) (institutional and legal arrangement for coordination)
Third day	Experiences in other countries (2) (continued)	Policies and preventive measures in related organizations in Iran
Forth day	Group discussions on unfinished air pollution issues and proposed solutions*	Group discussions* (continued) Preparation for presentation
Fifth day	Presentation of group discussions	Course Evaluation and summary

*Participants will be divided into 3 groups (seven persons/group)

Table I.7 Development of a Familiarization Course for New DOE Employees (Professional Course) (A1-5)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Both Mobile and Stationary Sources

Objectives:

1. To strengthen the practical knowledge of new DOE employees
2. To familiarize new DOE employees with various DOE workplaces

Main Implementing Organization and its Responsibilities:

EEB, DOE

Employment of advisors, collection of training topics from all specialized bureaus and deputies, drafting contents of lecture-type training sessions and TOR for short term job experiences, cost estimates for course implementation, negotiation with MPO on contents of the course, implementation and evaluation, preparation for directive

Related Implementing Organizations and their Responsibilities:

1. Specialized bureaus and deputies of DOE and DOE-TPD: proposing training topics, TOR for short term job experiences, providing lecturers
2. Environment related organizations: providing lecturers
3. Budget and Organizational Bureau, DOE: securing of operational budget for a task force and the course

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
Development and implementation of the course which consists of lectures and short-term job experiences

II. Fund, equipment and technology
Budget for hiring advisors and implementing the course

III. Laws and regulations
Preparation of a directive to make the course compulsory for new DOE employees

Processes:

1. Collection of training topics from specialized bureaus and deputies
2. Drafting lecture type sessions and TOR for short term job experiences
3. Negotiation with MPO
4. Securing of budget for course implementation
5. Preparation for directive to make the course compulsory for new DOE employees
6. Implementation and evaluation

Required Human Resource:

Advisors (2), DOE experts as lecturers, lectures from educational institutes

Human Resources Development:

Items to be Budgeted:

1. Employment cost for advisors
2. Implementation cost of the course

Expected Outcome:

1. Enhanced practical knowledge of new DOE employees
2. Prompt adaptation of new DOE employees to DOE workplaces

Implementing Schedule:

Collection of training topics (by July 2004)
Drafting lecture type sessions and TOR for short term job experience (by September 2004)
Negotiation with MPO (by October 2004)
Budget request to MPO (from December 2004)
Implementation and evaluation of the course (during FY2005)

Cost-Benefit Ratio:

It will enhance work efficiency and reduce burdens on managers to equip new DOE employees with practical knowledge by continuously implementing the training course for new DOE employees. Work motivation of new DOE employees will increase. Primarily, this project requires only costs for hiring advisors and implementing the course. Its cost-benefit ratio would be high in the long term.

Ideas about a familiarization course for new DOE employees (professional course):
Duration: 7 months, which consist of one month for lectures and six months of experiences in DOE directorates (2 months/ directorates)
Qualification: New DOE employees
Anticipated number of the participants: 100 persons?

Training Items:

Topics	Contents	Lecturers
Knowledge concerning DOE	- Missions, history, organization and priorities of DOE - Responsibilities of each bureau and relationships with other organization - Outlines of Ten-Year Action Plan	Head of DOE, DOE deputies
Practical Knowledge (general)	- Reporting and filing - Statistics and usage of statistical software	DOE experts, lecturers outside DOE
Practical Knowledge (specific)	- Environmental issues, monitoring and preventive measures by environmental media (air, water, soil etc) - Cross-sectoral and cross-media integration of environmental policy - Environmental education - Concepts and practices of sustainable development - Policies of related organizations	DOE expert, lecturers outside DOE such as College of Environment and Tehran University, officials of related organizations
Job Experiences	New DOE employees rotate through different bureaus, each for a short time. For example they work at three different bureaus, spending two months in each.	Concerned bureaus should prepare TOR on which new DOE employees experience jobs.

Table I.8 Development of a Training Course on Human Resources Development (A1-6)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Both Mobile and Stationary Sources

Objectives:

1. To enhance capabilities of DOE managers to train their staff through OJT
2. To enhance capabilities of DOE managers to propose training courses for their staff

Main Implementing Organization and its Responsibilities:

EEB, DOE:

Employment of an advisor to support drafting of the course, review of the current situation of OJT and the quality of current training proposals, drafting the course, identification of lecturers, cost estimates, negotiation with MPO concerning contents of the course, implementation and evaluation, preparation of a directive to make the course compulsory for newly promoted DOE managers

Related Implementing Organizations and their Responsibilities:

Budget and Organizational Bureau, DOE:
Securing funds for implementing the course

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
Development and implementation of the course

II. Fund, equipment and technology
Budget for hiring an advisor and implementing the course

III. Laws and regulations
Preparation of a directive to make the course compulsory for newly promoted DOE managers

Processes:

1. Employment of an advisor
2. Review of current OJT situation
3. Drafting the course including identification of lecturers
4. Negotiation with MPO
5. Securing funds for course implementation
6. Implementation and evaluation of the course

Required Human Resource:

One advisor, lecturers inside and outside DOE

Items to be Budgeted:

1. Employment cost of an advisor
2. Cost of implementing the course

Expected Outcome:

1. Enhanced knowledge of DOE managers concerning OJT
2. Enhanced skills of DOE managers to analyze training needs and propose training courses

Implementing Schedule:

Employment of an advisor and review of current situation (by July 2004)
Drafting the course (by August 2004)
Negotiation with MPO (by October 2004)
Budget request to MPO (from December 2004)
Implementation and evaluation of the course (during FY2005)

Cost-Benefit Ratio:

To sustain DOE's activities, it is critical to equip DOE managers with capabilities for analyzing training needs and providing OJT so that they can train future generations of DOE employees. This project primarily requires only costs for hiring an advisor and implementing the course. Its cost-benefit ratio would be high in the long term.

Ideas about a Training Course on Human Resources Development:

Anticipated number of the participants: 20～30

Duration: 5 days

Qualification of the Participants: newly promoted DOE managers who are responsible for working out training proposals, e.g., Director General or Deputy Director General of Bureaus in DOE HQs and Deputy or Head in Provincial Bureaus

Course Schedule:

Day	Morning Session	Afternoon Session
First day	DOE Manpower Policy and Needs - Roles of DOE managers in manpower development - Process of developing DOE Training Calendar	Human Environmental Management (1) - Trends and issues - Monitoring and preventive measures - Required skills
Second day	Human Environmental Management (2) - Trends and issues - Monitoring and preventive measures - Required skills	Natural Environmental Management (1) - Trends and issues - Monitoring and preventive measures - Required skills
Third day	Natural Environmental Management (2) - Trends and issues - Monitoring and preventive measures - Required skills	Knowledge and Practical of On the Job Training - Benefits of staff training - Definitions and features of OJT - Procedures and techniques of OJT
Forth day	Knowledge and Practical of On the Job Training (continued) Manpower development Planning - Job and position descriptions - Evaluation techniques of staff capabilities and interests - Development of training objectives and topics	Manpower development Planning (continued)
Fifth day	Exercise - Exercise by using current DOE training proposal forms) - Role play games for OJT	Presentation Summary and Course Evaluation

Table I.9 Feasibility Study for Construction of a Test Laboratory for Motorcycle Exhaust Emissions as Common Property of the Motorcycle Industry (B1-1)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Both Mobile and Stationary Sources

Objectives:

Implementation of exhaust emissions controls for motorcycles requires an exhaust emission test laboratory. However, there is now no exhaust emissions test laboratory for motorcycles in Iran. It is economically difficult for a small motorcycle company to own its own exhaust emissions test laboratory and there are more than 100 motorcycle small production companies in Iran. The motorcycle industry stated that they could not control exhaust emissions without an exhaust emissions test laboratory. So, early introduction of an exhaust emissions test laboratory as common property of the motorcycle industry is necessary for improvement of motorcycle emissions. This MAP conducts a feasibility study for the construction of a test laboratory for motorcycle exhaust emissions as common property of motorcycle industry.

Main Implementing Organization and its Responsibilities:

1. Management: MOIM
2. Implementation: Motorcycle production companies (manufacturers)

Related Implementing Organizations and their Responsibilities:

1. Review of 10 year action plan: DOE
2. Promotion of motorcycle industry: MOIM

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
Committee of examination: MOIM, DOE, Motorcycle manufacturers

II. Fund, equipment and technology
Funding: Subscription from motorcycle manufacturers
Subsidy from the Iranian Government

III. Laws and regulations
1. The Law of Road Vehicles
2. The Safety Regulation of Road Vehicles
3. The Law of Road Traffic

Processes:

1. Visits to European countries or Japan
2. Creation of specifications for the laboratory, examination of the budget

Required Human Resources:

1. Some Iranian Government officials
2. Engineers from motorcycle manufacturers
3. Specialist in this field (from Japan, if requested)

Human Resources Development:

1. Training in Japan Automobile Research Institute (JARI, if requested)
2. Trainer from JARI (if requested)

Items to be Budgeted:

Funding: Expenses for visit to European countries or Japan
Expenses for meetings

Expected Outcome:

Plan for construction of test laboratory for motorcycle exhaust emissions as common property of motorcycle industry.

Implementation Schedule:
From June to December of 2004

Cost-Benefit Ratio:
N.A.

Table I.10 Establishment of Project Management Unit (PMU) for Retrofitting Used Cars (B1-2)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduction of emissions from mobile sources

Objectives:
The proposed PMU aims to supervise, manage and control implementation of retrofitting used cars.

Main Implementing Organization and its Responsibilities:
MOT: Functions of implementing organization for retrofitting projects consist of policy making and project management.
MOT will take the role of project management, while DOE will take the role of policy making.

Related Implementing Organizations and Their Responsibilities:
1. DOE
   - To clarify and demarcate roles and responsibilities of MOT as PMU and DOE as policy-making organization through discussion of the "Task Force" formulated in DOE
   - To instruct PMU about the basic policy of the retrofitting project and to approve the implementation schedule formulated by PMU
   - To subsidize projects implemented by PMU
2. Traffic Police/Inspection Center
   - To monitor progress of projects and to facilitate their smooth implementation.

Measures to Achieve the Objectives:
I. Institutional, human resource, and public relations
   1. To formulate a "Task Force" in DOE to discuss roles and responsibilities of agencies and organizations relating to retrofitting projects.
   2. To establish PMU by MOT in accordance with instruction of the above-mentioned "Task Force"

II. Fund, equipment and technology

III. Laws and regulations
   To legislate roles and responsibilities of PMU in relation to other organizations relating to the project

Required Human Resource:
Project Manager, Project Management Technique Expert, Contract Specialist

Human Resources Development:
Project Management technique

Items to be Budgeted:
1. Cost of office preparation
2. Salaries of PMU members
3. Direct Project Costs (sub-contracted)

Expected Outcome:

1. Through discussions on the Task Force formulated by DOE, roles and responsibilities of DOE as the policy making body, PMU as the project management body, and car manufacturer, repair shops, car parts manufacturer, etc. as implementing contractors will be clarified and consequently total capacity to implement the project will be improved.
2. Introduction of Project Management Technique by PMU will bring about the spread of PM knowledge among relating organizations.
3. Smooth implementation of retrofitting will bring about emission reduction of pollutants from used cars.

Implementing Schedule:

2004.6 – 2004.12

Cost-Benefit Ratio:

A very high cost-benefit value can be expected.

Table I.11 Certificate for Emission Reduction Devices (B1-3)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduction of emissions from mobile sources

Objectives:

To promote development of effective emission reduction devices applicable for used cars by establishing a scheme to certify performance of developed devices

Main Implementing Organization and its Responsibilities:

DOE

Establishment of performance requirements, technical and financial support to development, evaluation and certification of developed devices

Related Implementing Organizations and their Responsibilities:

1. MOT
   To support activities of DOE from the standpoint of PMU, which supervises, controls, and manages implementation of used car retrofitting projects.
2. Ministry of Industry
   Technical and financial support to developers of emission reduction devices
3. MOO
   To formulate policy for fuel improvement to facilitate establishing strategy to develop emission reduction devices
4. MOI
   To supervise the Municipality

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
   1. To formulate a "Task Force" in DOE to discuss policies for emission reduction from private cars including establishment of a facility to support development of emission reduction devices by issuing certificates of performance
   2. To recruit experts from academic and industrial society in addition to members from above-mentioned organizations

II. Fund, equipment and technology
   1. To use budget from allocation to relevant fields of the Ten-Year Action Plan
   2. To utilize laboratories and research centers, etc outside of DOE to conduct verification testing of developed devices

III. Laws and regulations
   To legislate Emission Standards Applicable to Used Cars, Subsidy Systems for the Development of Emission Reduction Devices, Criteria for Certifying New Devices, Subsidy System to Support Retrofitting by Certified Devices"

Processes:

1. To accept application for verification and certification of developed devices submitted by manufacturers, suppliers, etc.
2. To conduct preliminary evaluation by expert group in the Task Force
3. To conduct laboratory testing for qualified application by expert group and independent laboratory
4. To decide acceptance or rejection of devices
5. Public announcement of certification

Required Human Resource:

Project Manager, Project Management Technique Expert, Automobile Engineering Expert from Iranian Government Organizations and Academic and Industrial Society, Expert from Japan

Human Resources Development:

Evaluation Techniques in Automobile Engineering

Items to be Budgeted:

1. Honorarium for Task Force members
2. Cost of office preparation
3. Cost of laboratory tests

Expected Outcome:

1. Performance requirements for retrofit devices will be demonstrated clearly
2. The period required to evaluate performance of applied devices will be shortened.
3. Development of new retrofit devices will be accelerated.

Implementing Schedule:

2004.6 – 2004.12

Cost-Benefit Ratio:

A very high cost-benefit value can be expected.

Table I.12 Examination of Implementing System (or Organization) for Adjustment of Idling Emissions on Roads (B1-4)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Mobile Sources

Objectives:

In the vehicle inspection center in Tehran, more than 50% of all inspected cars failed the idling emission test. According to Japanese historical data of the air pollution monitoring center, CO concentration began to decrease before 1975, when use of the after-treatment device was started. Adjustment of idling CO concentration was very effectively executed. In this MAP, the implementing system for adjustment of idling emissions on-road is examined, and an implementing system for it is proposed. If the Iranian government requires implementation, a pilot project will be created.

Main Implementing Organization and its Responsibilities:

1. Promoter: MOI → MOT (Collaboration or Contract)
2. Management: MOT → AQCC (Contract)
3. Budget: MOI

Related Implementing Organizations and their Responsibilities:

1. Budget Arrangement: DOE
2. Support: Traffic Police and Vehicle Inspection Center

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
   1. Management: AQCC form an implementing team, and order implementation, with report of actual results.
   2. Publicity: MOT

II. Fund, equipment and technology
   1. Budget: DOE (Ten-Year Action Plan), MOT
   2. Instrument: Idling emission analyzer
      - Cam closing angle tester
      - Timing light
      - Tool (screw wrench, screw driver etc.)
      - Calibration gas (CO, HC)

III. Laws and regulations
   1. The Law of Road Vehicles
   2. The Safety Regulation of Road Vehicles
   3. The Law of Road Traffic

Processes:

Process 1:

MOT to secure budget for DOI and DOE.
MOT makes a contract with AQCC after receiving the budget.

Process 2:

Pilot Project demonstrates a part of actual services to be contracted to local consultant in the next year.

Required Human Resource:

1. Some Iranian Government officials
2. Engine service mechanics
3. Trainers in this field

Human Resources Development:
Trainer trains engine mechanics to perform services on roads. Engine service mechanics are members of Khodro dealers.

Items to be Budgeted:
For example, 4 teams each of 2 engine mechanics, instruments, and trainer

Expected Outcome:
Early improvement of air pollution from mobile sources.

Implementing Schedule:
For example: pilot project: from Aug. 2004 to Jan. 2005

Cost-Benefit Ratio:
This MAP covers just adjustment. This MAP produces early effects using a small budget.

Table I.13 Institutionalized Process of Planning and Implementing Training Courses in Inspection Centers (B1-5)

Ultimate Goal: Improved Air Quality

Medium Level Goal: Reduced Pollutants from Mobile Sources

Objectives:
To institutionalize the process of planning and implementing training courses in Inspection Centers based on lessons learned from Pilot Project 6

Main Implementing Organization and its Responsibilities:
TVTIB: Determination of roles of each bureau or division in needs assessments, drafting TOR, contracts, and evaluation, and development and implement of new courses following defined role and process

Related Implementing Organizations and their Responsibilities:
MOT: approval of training courses and budgets

Measures to Achieve the Objectives:

I. Institutional, human resource, and public relations
Determination of roles of each bureau or division in needs assessments, drafting TOR, contracts, and evaluation

II. Fund, equipment and technology
Budget for implementing new courses

III. Laws and regulations
Preparation for directive to make roles of each bureau or division clear

Processes:

1. Determination of roles of each bureau or division
2. Preparation for directive to make roles of each bureau or division clear
3. Development of new training courses following PP6 process
4. Negotiation with MOT
5. Securing of budget for course implementation
6. Implementation and evaluation

Required Human Resource:
Lecturers from carmakers or educational institutions

Items to be Budgeted:
Implementation cost of new courses

Expected Outcome:

1. Established mechanisms to provide periodic training courses
2. Enhanced skills of technicians in Inspection Center

Implementing Schedule:

Determination of roles and preparation for detectives (by June 2004)
Drafting new courses (by August 2004)
Negotiation with MOT (by October 2004)
Budget request (from December 2004)
Implementation and evaluation of the course (during FY2005)

Cost-Benefit Ratio:

It is critical to equip inspection centers with administrative capabilities to provide periodic training programs in response to rapidly increasing demands. This primarily requires only costs for implementing courses. Its cost-benefit ratio would be high.

Table I.14 Improvement of On-street Parking Management, and Introduction of Traffic Wardens (B2-2)

Relevant Agencies: TTTO (implementing agency), Traffic Police, MOI

Policy Goals: Ultimate Goal: Improvement of Air Quality
Intermediate Goal: Reduction of Pollutants from Mobile Sources

Relevance to Ten-Year Action Plan:

Ten-Year Action Plan includes installation of parking meters, but the implementation schedule has been delayed because of the difficulty in obtaining a sufficient budget, as well as a shortage of enforcement officers. An effective on-street parking management system is urgently required.

Relevance to the Second Year Pilot Project:

Pilot Project 7 (PP7) is being implemented in Milade-nur where Pay and Display Machines are being installed.

Objectives of this MAP:

Reduction of pollutant emissions through better on-street parking management and introduction of non-police enforcement officers (Traffic Wardens). This would improve the efficiency of parking meters and increase revenue, which can in turn be used for hiring additional enforcement officers.

Action Items and the Responsible Agencies:

1. Preparation of a city-wide parking management plan based on the results of the Second year pilot project (TTTO, consultants, Traffic Police)
2. Detailed design for installing pay and display machines (TTTO)
3. Preparation of regulations regarding the introduction of Traffic Warden system (TTTO, Traffic Police, consultants)
4. Introduction of Traffic Wardens (TTTO, MOI)
5. Installation of Pay and Display Machines (TTTO)
6. Recruiting of Traffic Wardens (TTTO)
7. Training of Traffic Wardens (TTTO, Traffic Police)
8. Deployment of Traffic Wardens (TTTO, Traffic Police)
9. Public awareness campaigns for the new parking management system

Procedure:

1. Establishment of inter-agency WG
2. Preparation of regulation
3. Approval by the Executive Committee, and MOI
4. Approval by municipal assembly

Personnel Requirement:

WG members, Recruiting Traffic Warden

Items to be Budgeted:

1. Review of overseas experience in traffic management and enforcement practice (hiring of consultants)
2. Preparation of laws/regulation (hiring consultants)
3. Employment of Traffic Wardens
4. Pay and display machines
5. Public awareness campaigns（brochures, spot programs, broadcasting fees）

Expected Impacts:

Reduction of pollutant emissions from illegal parking and traffic congestions.

Schedule:

First Year: enacting laws and regulations, preparation of parking management plans, installation of pay and display machines

Second Year: employment of Traffic Wardens, training, deployment

Expected C/B Ratio:

High particularly in the area with high rate of illegal parking

Table I.15 Capacity Building of TTTO on Bus Priority Measures, and Implementation of Pilot Project (B2-3)

Relevant Agencies: TTTO (Main implementing body), Traffic Police

Policy Goals: Ultimate Goal: Improvement of Air Quality
Intermediate Goal: Reduction of Pollutants from Mobile Sources

Relevance to Ten-Year Action Plan:

The Ten-Year Action Plan includes bus fleet expansion and construction of urban rail, but the schedule has been delayed due to difficulty in budget allocation. Bus priority measures can be implemented to improve the public transport system in Tehran with a relatively low cost.

Relevance to the Second Year Pilot Project:

No relevance

Objectives of this MAP:

Capacity building of TTTO staff in preparation of bus priority measures, and implementation of pilot projects. Bus priority measures, which can be implemented with relatively low costs, could promote the use of public transport systems and reduce the use of private cars, reducing fuel usage and pollutant emissions.

Action Items and the Responsible Agencies:

1. Review of existing bus priority measures (TTTO, consultants)
2. Preparation of training programs on bus priority measures
3. Implementation of training programs including study tours overseas (TTTO, consultants)
4. Preparation of pilot project (TTTO, consultants)
5. Implementation of pilot project (TTTO, Traffic Police, consultants)
6. Preparation of a city-wide bus priority measures (TTTO)
7. Implementation of bus priority programs (TTTO)

Procedure:

1. Establishment of WG (TTTO, Traffic Police, Bus Company)
2. Approval by the Executive Committee
3. Approval by Municipality
4. Securing budget for pilot project
5. Securing budget for training
6. Securing budget for implementing bus priority measure

Personnel Requirement:

Traffic Engineers (with Masters degrees)

Items to be budgeted:

1. Budget for pilot project (consulting, equipment, design/construction)
2. Overseas training (three engineers/policy makers for two weeks)
3. Preparation of a city-wide bus priority programs, and implementation of feasibility studies (consulting)

Expected Impacts:

This program is expected to improve the public transport systems in the city, increase bus users, reduce the number of private car users, and reduce traffic congestion and pollutant emissions.

Schedule:

First Year: training including overseas study tour, and implementation of pilot project.
Second and Third Year: preparation of citywide bus priority measures and implementation.

Expected C/B Ratio:

High (medium to long term)

Table I.16 Training of Traffic Police and the Improvement of Curriculum in the Police Academy (B2-1)

Relevant Agencies: Traffic Police (Implementing Body), TTTO, Vehicle Inspection Center

Policy Goals: Ultimate Goal: Improvement of Air Quality
Intermediate Goal: Reduction of Pollutants from Mobile Sources

Relevance to Ten-Year Action Plan:

The Ten-Year Action Plan contains the training of Traffic Police, but a systematic training program has just started about one year ago. Traffic Management/Enforcement Course was established within the Police Academy, and about many traffic police were trained in 2003.

Relevance to the Second Year Pilot Project:

No Relevance

Objectives of this MAP:

Achieve reduction in air pollution through better traffic management and enforcement by strengthening the training systems of traffic police and the improvement of curriculum/courses at the Police Academy.

Action Items and the Responsible Agencies:

1. Review of existing problems in traffic enforcement and control of traffic flows (Traffic Police, consultants)
2. Review of curriculum in the police academy regarding traffic enforcement and flow control (TTTO, consultants, Traffic Police)
3. Selection of trainers (TTTO, Traffic Police consultants)
4. Training of trainers (TTTO, consultants)
5. Preparation of curriculum and training materials (TTTO, consultants)
6. Establishment of procedures for on-street vehicle emission inspection (Traffic Police, Vehicle Inspection Center)
7. Establishment of procedures for handling traffic accidents (Traffic Police)
8. Implementation of training (TTTO, Traffic Police)
9. Evaluation of training (Traffic Police, TTTO)

Procedure:

1. Establishment of WG (Traffic Police, TTTO, Vehicle Inspection Center)
2. Approval at the Executive Committee

Personnel Requirement:

Five Trainers (with Traffic Engineering Degrees), Trainees (initial stage 200 trainees)

Items to be Budgeted:

1. Training of trainers (expenses for sending five trainer trainees to overseas for three month each)
2. Preparation of training materials (video, training text)
3. Implementation of training (venue, equipment, photocopying, tea/coffee)

Expected Impacts:

It is expected to reduce vehicle emissions, particularly CO, through the improvement of traffic enforcement/flow control and reduction of traffic congestion.

Schedule:

First Year: Training trainers, curriculum development, preparation of teaching materials
Second and Third Year: Implementation of training and evaluation

Expected C/B Ratio:

High

Appendix J Manual for Database Operation[1]

(1) Introduction

The database was established in Farsi and English to support discussions at EC meetings and avoid repeated discussions. The database includes EC meeting minutes in Farsi, as well as English translations. These minutes should be added to the Excel program designed for this purpose. The database will be saved on an individual's computer and will be shared via local area networks to provide access to all members. The discussions are listed in chronological order in the database.

(2) Database Management and Operation Responsibilities

The responsible section is the General Affairs Unit of the EC Secretariat. Currently, Ms. Bahar Shoghi and Ms. Bahar Hamzehpour are responsible for English and Persian versions of the database, respectively.

(3) Process of Database Management/Operation

Record EC meeting minutes

The Acting Director of the EC Secretariat, Mr. Vahdati, regularly attends the EC meetings and prepares a draft of the minutes. A member of the Secretariat will deliver the finalized minutes at the next EC meeting.

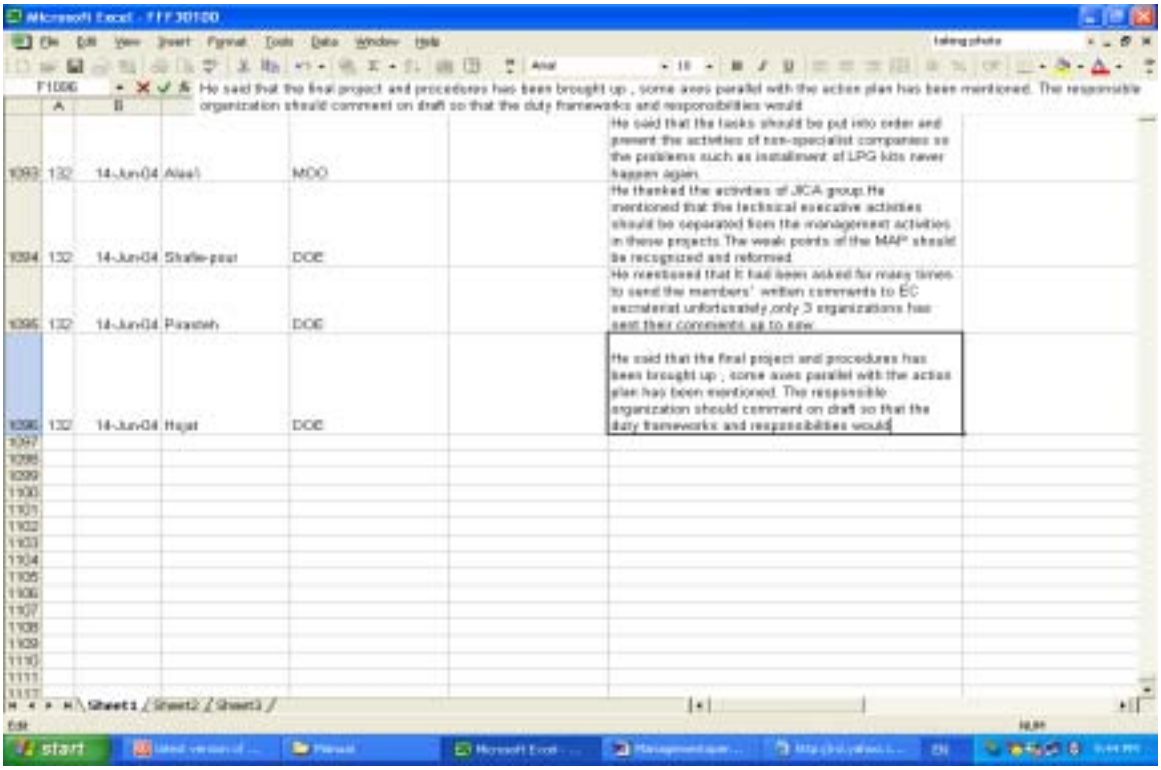
Enter minutes in database

The minutes will be translated by Ms. Bahar Shoghi of General Affairs Unit and added to Excel. Bahar Hamzehpour will add the Farsi version to Excel.

The information that should be entered into database includes:

- The number of the session (ex: as shown below 132);
- The date (ex: as shown below 14-Jun-2004);
- The name of the speaker (ex: as shown below: Alaa'i, Pirasteh,);
- The speaker's organization (ex: as shown below MOO, DOE,); and
- The speech.

[1] This manual was prepared by Ms. Bahar Shoghi, General Affairs Unit, EC Secretariat.

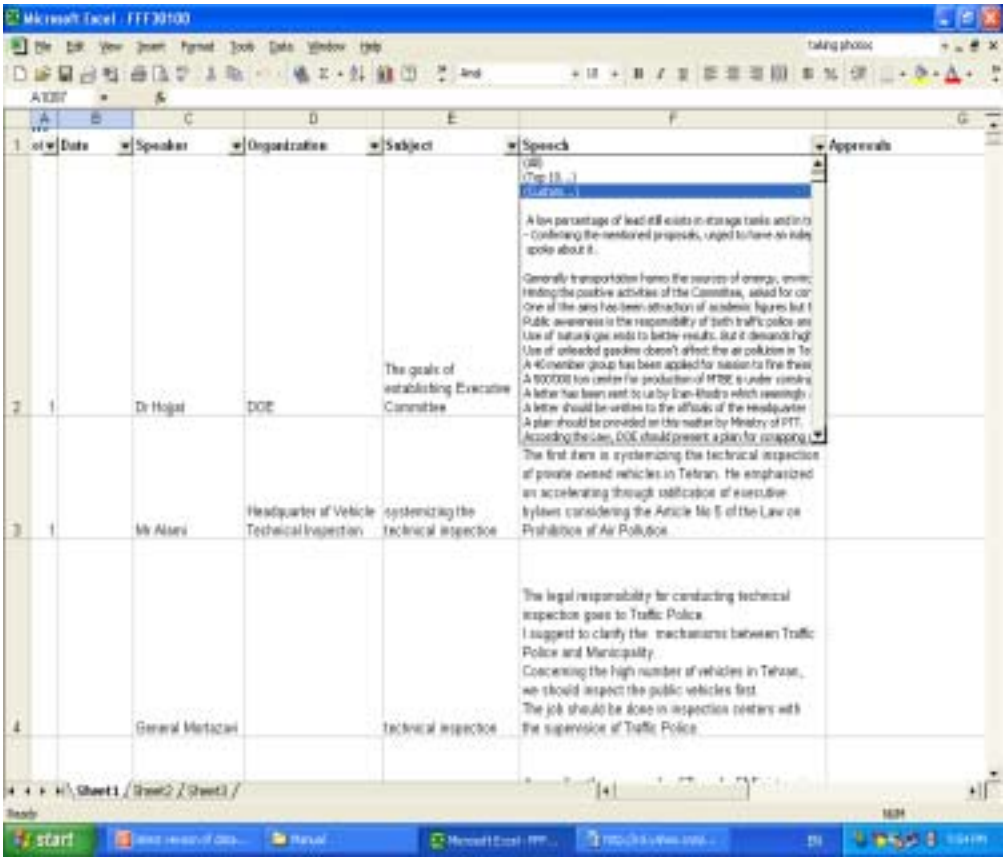


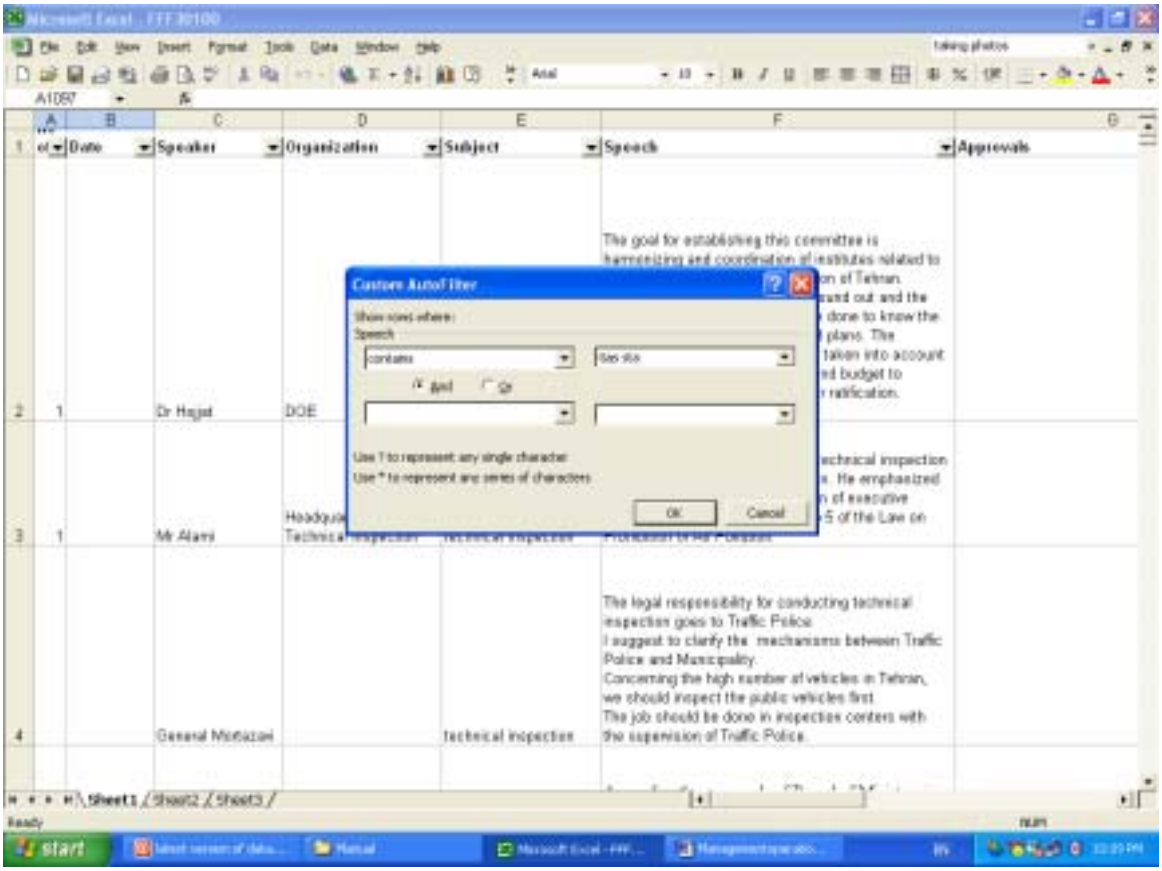
Search keywords in database

At every EC Secretariat meeting, the Acting Director should present the agenda and any keywords that are related in order to obtain a list of past discussions on the topics. A keyword search in the database will be undertaken by Ms. Bahar Shoghi.

Directions on how to conduct a search:

1. Click *Speech* and on the drop down menu, select *Custom*;
2. In the *Custom AutoFilter* box, select *contains* in the dropdown menu. Then type the keyword(s) on the right and click OK. The file will be sorted by the speeches that contain the keywords; and
3. In case that *A or B* should be searched (i.e. CNG gas station or CNG stations), follow the above instruction plus: select *or* and then on the below drop down menu select *contains* and type the second possibility keyword (Here CNG stations) and at the end click OK.


Microsoft Excel - FFF30100
Date
Speaker
Organization
Subject
Speech
Appraisals
Dr Hojat
DOE
The goals of establishing Executive Committee
Mr Alaei
Headquarter of Vehicle Technical Inspection
systemizing the technical inspection
The first item is systemizing the technical inspection of private owned vehicles in Tehran. He emphasized on accelerating through ratification of executive bylaws considering the Article No 5 of the Law on Prohibition of Air Pollution
General Mirtazavi
technical inspection
The legal responsibility for conducting technical inspection goes to Traffic Police.
I suggest to clarify the mechanisms between Traffic Police and Municipality.
Concerning the high number of vehicles in Tehran, we should inspect the public vehicles first.
The job should be done in inspection centers with the supervision of Traffic Police.
Sheet1
Sheet2
Sheet3
start



Report the results

The results are printed and should include the date, speaker(s), organization(s), subject(s), and speech (es).

Directions on how to print the report:

1. Locate the cursor on the *File* pull down menu, then select *Page Setup*;
2. In the page setup box, select the orientation to be set as *Landscape*; and
3. Select *Print*.

The results will be reported to the Acting Director before the EC sessions on Monday mornings.

Distribute Results

After the Acting Director approves the search results, the search results will be printed (25 copies) and distributed among the EC members by the Acting Director [Mr. Vahdati]

Updating of the Website with the Database

This database will be uploaded to http://tehranair.irandoe.org.

Database Maintenance

Every month a backup should be made of the database. This backup is a copy of database written on CD. This task will be conducted by Ms. Bahar Shoghi and Ms. Bahar Hamzehpour for English and Persian versions, respectively.

عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ۲ از ۱۲

فهرست :

کمیته اجرایی کاهش آلودگی هوای شهر تهران	
عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ۳ از ۱۲

۱- هدف

هدف از تدوین این روش اجرایی ارایه راهکاری مدون و مشخص برای حصول اطمینان از موارد زیر است.

۱-۱- تعیین مشخصات پروژه های در دست اقدام تحت نظر کمیته اجرایی کاهش آلودگی هوای تهران.

۱-۲- مشخص نمودن پیشرفت پروژه ها, مراحل مهم در پروژه ها و مشکلات هر پروژه می باشد.

۲ - دامنه:

این روش اجرایی جهت تمامی پروژه های در دست اقدام تحت نظر کمیته اجرایی لازم الاجرا می باشد.

۳- مراجع

۳-۱- مجموعه ساختار سازمانی, شرح وظایف و مسوولیت های کمیته اجرایی.

۳-۲- مجموعه ساختار سازمانی, شرح وظایف و مسوولیت های دبیر خانه کمیته اجرایی.

۳-۳- شرح وظایف و مسوولیت های نمایندگان سازمانها و وزارتخانه ها در کمیته اجرایی.

٤- تعاریف

۴-۱- کمیته اجرایی:

۴-۲- ریاست کمیته اجرایی: منظور معاون سازمان حفاظت از محیط زیست می باشد که بر اساس دستور معاون رییس جمهور و رییس سازمان حفاظت از محیط زیست ریاست این کمیته را بر عهده دارد و در این سند ریاست کمیته نامیده می شود.

۴-۳- دبیر کمیته اجرایی: منظور آقای وحدتی است و در این سند دبیر کمیته نامیده می شود.

۴-۴- نمایندگان سازمانها: منظور نمایندگان سازمانها و وزارت خانه هایی می باشد که بر اساس قانون و یا به صورت داوطلبانه در برنامه جامع کاهش آلودگی هوای شهر تهران همکاری دارند. در این سند نمایندگان نامیده می شوند.

کمیته اجرایی کاهش آلودگی هوای شهر تهران	
عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ٤ از ۱۲

۴-۵- پروژه های برنامه جامع ده ساله: کلیه برنامه های مصوب و تدوین شده در راستای دستیابی به اهداف برنامه مصوب مجلس شورای اسلامی در بهمن ماه ۱۳۷۸ می باشد.

۴-۶- پروژه های تقویت دبیر خانه کمیته اجرایی: کلیه برنامه های مصوب و تدوین شده در راستای دستیابی به اهداف برنامه ارایه شده از سوی آژانس همکاری های بین المللی ژاپن JICA می باشد.

۴-۷- دبیرخانه کمیته اجرایی: منظور اعضا و کارشناسان دبیرخانه کمیته اجرایی می باشد که بر اساس شرح وظایف موظف به پیگیری مسایل و برنامه ها و جلسات کمیته اجرایی می باشند. در این سند دبیرخانه نامیده می شود.

تبصره : از آنجاییکه در حال حاضر دبیرخانه کمیته اجرایی به صورت رسمی تشکیل نشده است, منظور در این روش اجرایی در حال حاضر اعضای دفتر JICA می باشد.

۵- مسوولیتها :

۵-۱- مسوولیت بررسی و تصویب پروژه ها بر عهده کمیته اجرایی می باشد.

۵-۲- مسوولیت تهیه و به روز رسانی فهرست پروژه های در دست اقدام (فرم شماره ۱) بر عهده دبیر کمیته می باشد.

۵-۳- مسوولیت تدوین، هدایت و پیگیری برنامه های اجرایی پروژه های برنامه جامع ده ساله و پروژه های برنامه تقویت دبیرخانه کمیته اجرایی با توجه به مسئولیت مرتبط مشخص شده به عهده سازمان مربوطه خواهد بود.

۵-۴- مسوولیت تهیه فرمهای لازم برای نمایندگان سازمانها بر عهده دبیرخانه می باشد.

۵-۴- مسوولیت تکمیل فرم اطلاعات اولیه پروژه (فرم شماره ۲) بر عهده نمایندگان می باشد.

۵-۵- مسوولیت ارایه وضعیت پیشرفت پروژه ها (فرم شماره ۳) بر عهده نمایندگان خواهد بود.

۵-۶- مسوولیت جمع آوری و جمع بندی اطلاعات ارایه شده توسط نمایندگان و ارایه آن در نمودار پیشرفت پروژه ها بر عهده دبیر خانه کمیته اجرایی می باشد.

٦- روش اجرا :

۱- پس از تکمیل فهرست پروژه های در دست اقدام (فرم شماره ۱) در جلسه کمیته اجرایی, دبیرخانه کمیته اجرایی موظف

کمیته اجرایی کاهش آلودگی هوای شهر تهران	
عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	**شماره بازنگری : ۰**
شماره سند : ECS-PC-PD-001	**صفحه ۵ از ۱۲**

است فرمهای شماره ۲ را برای هر پروژه و هر سازمان مسوول تکمیل نموده, و در اولین جلسه کمیته اجرایی با تایید ریاست کمیته اجرایی در بین نمایندگان توزیع نماید. ریاست کمیته اجرایی فرمهای اطلاعات اولیه پروژه را در

عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ۱ از ۱۲

پیوست شماره ۱ : فرم شماره ۱ فهرست پروژه های در دست اقدام

کد پروژه	نام پروژه	مجری	تاریخ تصویب	تاریخ تایید	توضیحات

کد فرم : 01

PC-

تهیه کننده: دبیر کمیته اجرایی

تایید کننده: ریاست کمیته اجرایی

کمیته اجرایی کاهش آلودگی هوای شهر تهران	
عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ٦ از ١٢

کمیته اجرایی کاهش آلودگی هوای شهر تهران	
عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ۲ از ۱۲

پیوست شماره ۲: فرم شماره ۲ اطلاعات اولیه پروژه.

نام پروژه:	محور برنامه:	کد پروژه:	توضیحات
سازمان مجری:	سایر سازمانهای همکار در این پروژه:		
تاریخ تصویب:	زمان شروع پروژه:	پیش بینی زمان اتمام پروژه:	
نام فرد مسوول در سازمان:	سمت فرد مسوول در سازمان:	تلفن تماس با فرد مسوول در سازمان:	
آدرس فرد مسوول در سازمان:			
فازهای اصلی پروژه:	زمان شروع فاز:	پیش بینی زمان اتمام فاز:	
۱-			
۲-			
۳-			
٤-			
٥-			
٦-			
نام نماینده سازمان در کمیته اجرایی *:	سمت نماینده در سازمان:	تاریخ تکمیل فرم:	امضا

* قسمتهایی که با این علامت مشخص شده اند توسط دبیرخانه تکمیل می گردد.

کد فرم : PC-02

کمیته اجرایی کاهش آلودگی هوای شهر تهران	
عنوان سند : روش اجرایی کنترل و پایش پیشرفت پروژه ها	شماره بازنگری : ۰
شماره سند : ECS-PC-PD-001	صفحه ۳ از ۱۲

پیوست شماره ۳: فرم شماره ۳ پیشرفت پروژه ها.

نام پروژه:*	محور برنامه:*	کد پروژه:*	توضیحات
نام سازمان مجری:*	سایر سازمانهای همکار در این پروژه:*		
تاریخ تصویب:*	زمان شروع پروژه:*	پیش بینی زمان اتمام پروژه:*	

کارهای اصلی پروژه:*	زمان شروع کار:*	درصد پیشرفت:	رویدادهای مهم / مشکلات اجرایی
۱-			
۲-			
۳-			
٤-			
٥-			
٦-			

درصد پیشرفت تجمیعی کل پروژه*		وضعیت کیفی پیشرفت پروژه:
آیا پروژه طبق برنامه زمان بندی پیش می رود؟	☐ بلی ☐ خیر	☐ بسیار خوب ☐ خوب ☐ متوسط ☐ بد ☐ بسیار بد

نام نماینده سازمان در کمیته اجرایی:*	تاریخ آخرین اطلاعات دریافتی:*	تاریخ تکمیل فرم:	امضا

* قسمتهایی که با این علامت مشخص شده اند توسط دبیرخانه تکمیل می گردد.

کد فرم : PC-03

آخرين وضعيت پيشرفت پروژه هاي برنامه جامع ده ساله

تهيه و تنظيم :

دبيرخانه كميته اجرايي كاهش آلودگي هواي تهران

زمستان 1383

آخرين وضعيت پيشرفت پروژه هاي برنامه جامع ده ساله

تهيه و تنظيم : دبيرخانه كميته اجرايي كاهش آلودگي هواي تهران

1- مقدمه اي بر برنامه جامع

در زمينه وسعت و پيچيدگي، اهميت انتشار و ابعاد اجرايی روش های جهت مقابله با آلودگی هوا، سه طرح مطالعاتی با همکاری مرکز تحقیقاتی کشور تا سال(2-1371)1993 و (76-75 13) 1997میلادی صورت گرفته است:

1- برنامه جامع تلفیقی کنترل آلودگی هوا در تهران بزرگ(که یک طرح مشارکتی با شهرداری تهران و آژانس همکاری های بین المللی کشور ژاپن (جایکا) می باشد.)
2- برنامه کاهش عبور و مرور در تهران (باهمکاری شهرداری تهران و بانک جهانی)
3- کنترل حمل و نقل وسایل نقلیه موتوری (طرح مشارکتی بین فرهنگستان علوم و وزارت صنایع و معادن جمهوری اسلامی ایران)

کمیته اجرایی اقدام به یکپارچه سازي نتايج تحقيقات انجام شده و تدوين " برنامه جامع ده ساله جهت كاهش آلودگی هوا ناشی از وسایل حمل ونقل هوای شهر تهران " نمود. برنامه 7 محوري توسط كميته اجرايی تهيه گرديد و هيات محترم وزيران در بهمن ماه سال 1378 (فوريه سال 2000 ميلادی) آنرا تصويب نمود.

در بخش 2 خلاصه ای از هر قسمت ذكر شده است كه اين خلاصه تا نوامبر سال 2004(دی ماه سال 1383) به روز گرديده است. اطلاعات گزارش نيز به استناد مطالعاتی است كه تيم مطالعاتی جايكا با همكاري اداره كل محيط زيست استان تهران (دبيرخانه كميته اجرايي كاهش آلودگي هوا) در مرحله دوم طرح مطالعاتی خود آنها را جمع آوری نموده است.

2- مراحل برنامه جامع و روند آنها:

2-1- محور اول:

وسایل نقلیه موتوری جدید

اهداف:

در رابطه با کاهش آلاینده ها از طریق وسایل نقلیه موتوری جدید، استفاده از سیستم های جدید سوخت رساني و احتراق با استفاده از تبدیل کننده کاتالیزوری و لوازم مرتبط با آن جهت کاهش آلاینده ها می باشد .این کار مطابق با استاندارد های ECE 15.04 و سپس ECER 83 می باشد.

طرح ها:

استاندارد خودروهای وارداتی، استاندارد کردن خودروهای تولید داخل، استاندارد کردن ماشین آلات سنگین، تقویت و برقراری استاندارد هایی جهت موتور سیکلت ها

سازمان مجری:

وزارت صنایع و معادن

سازمان همکار:

سازمان حفاظت محیط زیست استان تهران ، موسسه استاندارد و تحقیقات صنعتي ایران ، شرکت بازرسي کیفیت و استاندارد خودرو

پیشرفت طرح تا آذر ماه سال1383 (نوامبر 2004) :

طرح های اصلی	وضعیت و روند پیشرفت طرح	موانع/ پیشنهادها / توضیحات
اجرای استاندارد ECER 83 جهت تولیدات داخلی و وسایل سبک نقلیه موتوری	**از 52 مدل خودروي موجود 34 مدل اصلاح شده، 21 مدل نادیده گرفته شده و حذف شده، 1 مدل در حال بررسي مي باشد.**	**سایر موارد استاندارد های ECER 83.03 ادامه خواهد یافت، همکاری وزارت صنایع در این رابطه بسیار مورد نیاز است،**

		رعايت استاندارد هاي بهتر بستگی به اصلاح کیفیت سوخت دارد.
اجرای استاندارد EU 2000 برای ماشین آلات سنگین	مقدمات برقراري استاندارد EU2 در حال انجام است	اجراي استاندارد EU 2 از سال 83 آغاز خواهد شد.
اجرای استاندارد ECER 49 جهت ماشین آلات سنگین	تابحال آغاز نشده است	EU2 به جاي ECER 49 به کار گرفته خواهد شد.
اجرای استاندارد ECER 49 جهت کلیه مینی بوسها	تابحال آغاز نشده است.	EU2 به جاي ECER 49 به کار گرفته خواهد شد.
اجرای استاندارد ECER 49 برای مینی بوسهای وارداتی	تابحال آغاز نشده است.	EU2 به جاي ECER 49 به کار گرفته خواهد شد.
اجرای استاندارد ECER 49 به همراه تبدیل کننده کاتالیزوری براي خودرو هاي سنگین	تابحال آغاز نشده است.	با برقراري استاندارد EU2 نیازي به این استاندارد نخواهد بود
اصلاح سیستم های اتوبوس ها جهت استفاده از گاز طبیعی به همراه نصب تبدیل کننده کاتالیستی	حدودا در مورد 1000 دستگاه اتوبوس به اتمام رسیده است.	مراجعه به فصل حمل و نقل عمومي
اجرای استاندارد EU 97 جهت موتورسیکلت ها به همراه پیشرفت دربهبود سیستم سوخت	مرکز آزمون براي موتور سیکلت ها به زودي بهره برداري خواهد شد.	نبود مراکز مناسب براي آزمون تدوین نظام هماهنگ تولید با لزوم رعایت استاندارد هاي زیست محیطي ضروري است
اجرای استاندارد EU 97 برای موتورسیکلت های گازسوز به همراه اصلاح سیستم سوخت	هنوز آغاز نشده است.	موتور سیکلت هاي گازي در سطح جهاني محبوب نیستند. این پروژه به نظر مي رسد که وجود خارجي ندارد. این پروژه باید حذف شود.
استفاده از تبدیل کننده کاتالیزوری جهت موتورسیکلت ها	هنوز آغاز نشده است.	در برنامه اجراي ECE 40.01 نیازي به مبدل کاتالیزوري براي آن نیست. این پروژه به نظر مي رسد که وجود نداشته باشد. لزوم تدوین و تعریف استاندارد جدید وجود دارد.

2-2- محور دوم : خودروهای فرسوده :

اهداف:

حرکت خودروهای فرسوده ، روش رانندگی، و کیفیت پایین لوازم یدکی جهت وسایل نقلیه موتوری در تهران، باعث هدررفتن بنزین ،ایجادآلودگی هوا و آلودگی صوتی می شود .هدف آن است که در مرحله دوم با سازماندهی کردن برنامه های وسیع و گسترده برای تعویض خودروهای فرسوده با انواع جدید، استاندارد ها را به مرحله اجرا در آید.براساس تحقیقات انجام شده پیش بینی می شود انتشار آلودگیها در ده سال آینده کاهش یابند.

طرح ها:

تعویض پیکانهای کاربراتوری بالای ده سال با نوع انژکتوری آنها ، نصب تبدیل کننده کاتالیزوری برای تاکسی های گازسوز، تجهیز موتورسیکلت با تبدیل کننده کاتالیزوری، جایگزیني وسایل نقلیه شخصی فرسوده .

سازمان مجری :

وزارت صنایع و معادن ، شهرداری تهران

پیشرفت طرح تا آذرماه سال 1383 (نوامبر 2004) :

طرح های اصلی	وضعیت و روند پیشرفت طرح	موانع / پیشنهادات
جايگزيني كاربراتور افشانه اي به جاي كاربراتور پيكان هاي فرسوده بالاي ده سال	**هنوز آغاز نشده است.**	▪ **كمبود ماشين آلات ، كارگاهها، و بودجه مورد نيازدر اين زمينه.** ▪ **لزوم همكاری بين شهرداری تهران ، وزارت كشورو صنايع توليد كننده** ▪ **شركت كنترل كيفيت هوا براي تغيير 1000 خودرو**

		پيكان در مرحله اول با همكاري سازمان حفاظت محيط زيست آمادگي دارد. ▪ **آگاه سازي اقشار هدف ضروري است .** ▪ **محل تامين منابع مالي بايد شفاف شود.** ▪ **سازمان هاي مسوول بايد دقيق و شفاف تعيين شوند.**
نصب تبدیل کننده کاتالیزوری جهت تاکسیهای گازسوز	**هنوز آغاز نشده است.**	**برقراري يك سيستم هدفمند براي هماهنگ سازي سازندگان خودرو با شهرداري تهران**
تجهیز موتورسیکلت ها به تبدیل کننده کاتالیزوری	**در حال تحقیق و بررسی می باشد.**	**مشكل تعدد و گوناگوني تعداد زياد توليد كنندگان موتورسيكلت** **لزوم تدوين و تعريف استاندارد جديد وجود دارد.**
نوسازی و اسقاط 200000 خودروی شخصی	**گروه كاري تشكيل شده و بحث در مورد جزييات ادامه دارد.**	✓ **عدم پشتيباني مالي، محل تامين منابع مالي بايد شفاف شود.** ✓ **ساز و كار مشخصي وجود ندارد.** ✓ **عدم وجود تجهيزات بازيافت و از رده خارج كردن اين خودرو ها** ✓ **عدم همكاري بين سازماني مناسب** ✓ **وجود تعرفه بالا براي خودروهاي وارداتي** ✓ **وزارت صنايع آماده همكاري در چهار چوب**

		مصوبات اخیر هیات وزیران است. ✓ **سازمان هاي مسوول باید دقیق و شفاف تعیین شوند.**

3-2- سومین محور : وسایل حمل و نقل عمومی

اهداف:

هدف بالا بردن کمیت و کیفیت ناوگان حمل و نقل عمومی است ، به ویژه در استفاده از سوخت پاک برای تاکسیها ، مینی بوسها و اتوبوسهاو تسهیل در تکمیل خطوط مترو، ونیز استفاده مناسب از حمل و نقل ریلی سبک.

طرح ها :

افزایش تعداد اتوبوسها، تعویض سیستم سوخت اتوبوسها به گاز طبیعي فشرده، نصب تبدیل کننده کاتالیزوری در انوبوسهایی که با گاز طبیعی فشرده کار می کنند، تبدیل سیستم سوخت مینی بوسهای دیزلی به گاز طبیعی فشرده، بهبودو تسریع در حمل و نقل عمومی خطوط مترو.

سازمان مجری :

وزارت کشور، شهرداری تهران

پیشرفت طرح تا آذرماه سال 1383 (نوامبر 2004) :

طرح های اصلی	**وضعیت و روند پیشرفت طرح ها**	**موانع / پیشنهادات**
افزایش کمی تعداد اتوبوسها تا 6000 دستگاه	**به طور کامل انجام شده است.**	**تا سال 1384 این تعداد باید به 7500 دستگاه افزایش یابد.**
تبدیل سیستم سوخت اتوبوسها به	**درمورد حدود 1000 اتوبوس به**	✓ **ظرفیت براي تولید تعداد**

گاز طبیعی فشرده همراه نصب تبدیل کننده کاتالیزوری بر روی آنها	اتمام رسیده است و تبدیل 2000 دستگاه دیگر نیز در برنامه سال 2003-4 در خواهد آمد.	اتوبوس هاي گازسوز لازم وجود دارد. (وزارت صنايع) ✓ محل تامين منابع مالي براي تبديل ساير اتوبوس ها بايد شفاف شود. ✓ سازمان هاي مسوول براي تبديل ساير اتوبوس ها بايد دقيق و شفاف تعيين شوند.
تبدیل سیستم سوخت اتوبوسها به گاز مایع طبیعی	لغو شده است.	امکان پذیر نمی باشد.
تبدیل سیستم سوخت مینی بوسهای دیزلی به گاز طبیعی فشرده	حدود 100 دستگاه به پایان رسیده است.	بودجه محدود که تاکنون تنها از طرف سازمان حفاظت محيط زيست پرداخت شده است. نبود يك سامانه بازيافت يك مانع جدي است.
افزایش ظرفیت حمل ونقل عمومی از طریق ایجاد خطوط قطار برقی درون شهری(افزایش و گسترش حمل ونقل ریلی سبک)	بخشي از تحقيقات براي يكي از خط هاي مونوريل به پايان رسيده است و مطالعه براي 8 يا 9 خط ديگر ادامه دارد (سازمان حمل و نقل و ترافيك تهران)	✓ براي اجرا در ابعاد بزرگ نيازمند تاييد شوراي عالي ترافيك و يا هيات وزيران مي باشد. ✓ هيچ مساله و مشكلي در مرحله تحقيقاتي يا به صورت موردي وجود ندارد.
افزایش خطوط مترو	چهار خط اصلي در حال تكميل است و خط هاي جديد و تكميل خط هاي فعلي در شركت راه آهن شهري تهران و حومه (مترو) در دست بررسي است.	محدوديت زماني و كمبود بودجه مراحل اجرا را به كندي پيش مي برد.

2-4-محور چهارم: سوخت

اهداف:

هدف بهبود کیفیت سوخت ، کاهش مصرف سوخت، و جانشینی سوخت پاک و تا حدودی کاستن از آلودگی هوای تمامی مناطق شهري است
وزارت نفت قصد جایگزینی سوخت وسایل نقلیه عمومی در تهران را دارد که تخمین زده می شود کاهش آلاینده ها را در طول ده سال بر پایه مطالعاتی که صورت گرفته است، به دنبال داشته باشد.

طرح ها:

استفاده صحیح از سوخت ها، بهبود کیفیت سوخت، تبدیل و جایگزینی سیستم سوخت فسیلی به گازی

سازمانهای مجری:

وزارت نفت
پیشرفت طرح تا آذرماه سال 1383 (نوامبر 2004) :

طرح های اصلی	وضعیت وروند پیشرفت طرح	موانع/ پیشنهادات/توضیحات
توزیع بنزین بدون سرب	**در سال 2002 در تهران به اتمام رسید و درسال 2003 در تمامی کشور تکمیل شد.**	**با افزایش تولیدات جدید که در راستاي استاندارد هاي بالا تري هستند ، لزوم بهبود کیفیت سوخت به ویژه بنزین ضروري به نظر مي رسد**
حذف نمودن گوگرد ازسوخت دیزلی	**توزیع سوخت دیزلی با گوگرد پایین برای شرکت اتوبوسرانی تهران در سال 2002 شروع شد. در حال حاضر در چند شهر سوخت دیزل با گوگرد پایین تر براي اتوبوسراني توسط وزارت نفت تامین مي گردد.**	**تغییرات عمده ای در زمینه خطوط لوله و تجهیزات پالایشگاهها لازم است که دستیابی به این اهداف در این زمینه بسیار مشکل می باشد. کیفیت در حال پیشرفت است. حمایت دولت ضروري مي باشد.**

تبديل سوخت به گاز	اتوبوس		تبديل تمام سيستم ها ي گاز مايع به گاز طبيعي فشرده ضروري است (شهرداري تهران و وزارت نفت) تامين منابع مالي بايد شفاف شوند. سازمان ها ي مسوول بايد شفاف شوند. نياز به ايجاد جايگاه هاي سوخت گيري بيشتر احساس مي شود.
	مينى بوس		تامين منابع مالي بايد شفاف شوند. سازمان ها ي مسوول بايد شفاف شوند. تاكنون سازمان محيط زيست اين مسووليت را به عهده گرفته ولي پس از آن براي 8000 مينى بوس باقيمانده متولي مالي ضروري است. نياز به ايجاد جايگاه هاي سوخت گيري بيشتري احساس مي شود.
	تاكسي		يك پروژه با همكاري وزارت صنايع در حال اجراست(براي تبديل گاز مايع به گاز طبيعي فشرده در خودروها) تامين منابع مالي بايد شفاف شوند. سازمان ها ي مسوول بايد شفاف شوند. نياز به ايجاد جايگاه هاي سوخت گيري بيشتري احساس مي شود.

	ديگر خودرو ها	**تبديل نمونه خودروهاي سبك توليدي (پايلوت)**	**تامين منابع مالي بايد شفاف شوند. سازمان ها ي مسوول بايد شفاف شوند. نياز به ايجاد جايگاه هاي سوخت گيري بيشتري احساس مي شود.**
		تبديل 1000 خودرو به دوگانه سوز در مقياس كارگاهي	
		تبديل 554000 خودرو به دوگانه سوز(كارخانه اي)	
		تبديل نمونه خودرو هاي ديزل به دوگانه سوز	
		احداث جايگاه هاي سوخت گيري گاز CNG	
		حذف توليد خودروهاي با فن آوري قديمي و پرمصرف و ايجاد ظرفيت و توليد انبوه خودروهاي طراحي شده براي استفاده از گاز طبيعي در خطوط توليد	

5-2- پنجمین محور: برنامه ایجاد مراکز معاینه فنی وتوانمند سازي تعمیرگاهها:

اهداف:

معاینه فنی وسایل نقلیه موتوری باعث کاهش مصرف سوخت و انتشار آلودگی ها، کنترل در کیفیت ، ایمنی خودروها و کاهش تصادفات و همچنین تنویرافکار و مشارکت عمومی می شود

این گونه اقدامات موجب تغییرکردن ، افزایش و بهبود کار در مراکز معاینه فنی و تعمیرگاهها می شود. لکن قسمت اصلی این مرحله تسهیل در روند فعالیت های مراکز معاینه فنی و تعمیرگاهها می باشد. این امر باعث کاهش مقدار قابل توجهي مصرف سوخت خودروها و کاهش انتشار آلودگی در شهر تهران مي گردد.

طرح ها:

اجرای برنامه های فنی و تعمیراتی و ایجاد دیگر مراکز معاینه فنی خودرو و تعمیرگاهها برای خودروهای شخصی ، ماشین آلات سنگین و موتورسیکلت ها نیز از دیگر پروژه های در نظر گرفته شده می باشد.

سازمان های مجری:

شهرداری تهران ، با همکاري راهنمایی و رانندگی

پیشرفت طرح تا آذرماه سال 1383 (نوامبر 2004) :

طرح های اصلی	وضعیت و روند پیشرفت طرح	موانع/ پیشنهادات
اجرای برنامه های فنی و تعمیراتی (برنامه اطلاع رسانی) برای مراکز معاینه فنی خودرو	اجرا توسط کمیته سه جانبه	کمیته سه گانه مرکزی مرکب از پلیس راهنمایی و رانندگی، سازمان حفاظت محیط زیست و شهرداری تهران (ستاد مرکزي معاينه فني خودرو ها) در این زمینه به صورت مرتب تشکیل گردد. جلسه هاي كميته سه گانه برخي اوقات تشكيل نمي شود و يك برنامه منسجم و بلند مدت با ضمانت اجرايي قوي در اين زمينه وجود ندارد. استانداردهاي مناسبي براي تنظيم موتور وجود ندارد. در زمينه خودرو هاي جديد يك همكاري فراگير بين خودرو سازان با مراكز معاينه فني خودرو وجود ندارد. يك نياز ضروري به تبليغات عمومي براي تشويق براي افزايش مراجعات مردم به اين مراكز وجود دارد. افزايش تعميرگاه هاي مجاز به ارايه سرويس تنظيم موتور و ساير سيستم هاي خودرو افزايش و برقراري برنامه هاي آموزشي براي تكنسين هاي اين مراكز ضروري است.

ایجاد مراکز معاینه فنی خودروها	6 مرکز معاینه فنی خودرو از سال 2002 آغاز به کار نموده اند. 26 خط براي خودرو هاي سبك و 10 خط در 5 مرکز براي معاينه فني موتور سيكلت ها ضروري است.	مرکز هفتم در سال 84 به بهره برداري خواهد رسيد.
ایجاد مراکز معاینه فنی وسایط حمل ونقل سنگین	سه مرکز طراحي شده و زمين و لوازم و تجهيزات مورد نياز نيز براي اين فعاليت فراهم گرديده است.	▪ نبود بودجه و عدم همكاري بخش خصوصي ▪ كمبود بودجه براي نصب تجهيزات ▪ كميته چهار گانه بايد بين وزارت راه و ترابري ، شهرداري تهران ، راهنمايي و رانندگي و سازمان حفاظت محيط زيست برقرار شود.
ایجاد مراکز معاینه فنی موتورسیکلت ها	در بعضی مراکز اجرا می شود .	▪ فقدان همكاري از طرف صنايع توليد كننده موتور سيكلت ▪ نبود سرمايه گذار بخش خصوصي ▪ معاینه فنی موتورسیکلت ها اجباری نمی باشد.
معرفی سیستم کنترل قطعات مختلف خودروها (برقراری سیستم کنترل کیفی)	هنوز آغاز نشده است.	▪ موسسه استاندارد و تحقيقات صنعتي بايد استاندارد هاي لازم را تهيه و تدوين نمايد. ▪ تطابق با اين استاندارد ها توسط خودرو سازان بايد اجباري شود. ▪ هيچ برنامه اي در اين

		مورد در ستاد مرکزي معاينه فني خودرو ها وجود ندارد.

2-6- محور ششم: مديريت ترافيک

اهداف:

اگرچه مديريت ترافيك يكي از ابزارهاي مهم در كاهش آلودگي هواي كلان شهر تهران مي باشد، اما اين محور در حال حاضر محدود به پروژه نصب چراغ هاي هوشمند ، اصلاح هندسي تقاطع ها و نصب پاركومتر ها گرديده است .در اين مرحله نصب پاركومترها در خيابان ها در حال انجام است كه موجب روان سازی جريان تردد خودروها و كاهش آلاينده ها در منابع متحرک ميگردد بديهي است با اعمال سياست هاي فوق براي پارك و تردد خودرو ها در شهر تهران لزوم ايفاي نقش بيشتري در اين محور ضروري به نظر مي رسد.

طرح ها :

نصب پاركومتر ها ، نصب چراغ های هوشمند و اصلاح هندسي تقاطع ها ، ايجاد سياست پارك و تردد خودرو ها

سازمانهای اجرایی :

شهرداری تهران ، پليس راهنمايی و رانندگی

پيشرفت طرح ها تا آذرماه سال 1383 (نوامبر 2004) :

طرح های اصلی	وضعیت و روند پیشرفت طرح	موانع / پیشنهادات
نصب پارکومتر واجرای سیاست مدیریت خودروها و پارکومترها	**در حال انجام است.**	▪ **کنترل و نظارت بر نصب و مدیریت هماهنگی پارکومترهای نصب شده مورد نیاز است.** ▪ **محدودیت بودجه وجود دارد.** ▪ **طرح پاركبان فعلي نيازمند كار كارشناسي بيشتر است**
نصب چراغهای هوشمند و خطوط سبز	**تحقیقات در400 تقاطع به اتمام رسیده است.** **56 تقاطع مجهز به چراغ هاي هوشمند شده است** **26 تقاطع در حال تجهيز مي باشد.**	**مشکلات مالی وجود دارد.**

در رابطه با مديريت ترافيك پروژه يا برنامه جامعي شامل ابعاد مختلف سفرهاي درون شهري، مهندسي ترافيك و رابطه آن با مديريت زمان و ... مورد نياز مي باشد.

2-7- محور هفتم : آموزش و تنوير افكار عمومي

اهداف:

این محور در برگیرنده افزایش توانایی های فنی تکنسین ها ، مهندسین و کارشناسان ، و آگاهیهای عمومی در خصوص کاهش آلودگی هوا بواسطه برنامه های آموزشی می باشد. چنانچه برنامه هاي آموزش عمومي همراه با همکاری تکنسین های ماهر و با تجربه درمعاینه فنی خودروها و تعویض قطعات معیوب اجراشود و سطح مشاركت عمومي با رعايت ملاحظات زيست محيطي و معاينه فني و كاهش مصرف سوخت بالاتر رود می توان انتظار داشت که آلودگی هوا در شهر تهران تا 20 درصد کاهش پیدا کند.

طرح ها:

آموزش تکنسین ها و تعمیر کاران مراکز معاینه فنی ، آموزش تکنسین ها و تمیرکاران اتوبوسها ، آموزش پلیس راهنمایی و رانندگی واجرای برنامه های تنویر افکار عمومی و جلب مشارکت هاي مردمي.

سازمان مجری :

شهرداری تهران ، پلیس راهنمایی و رانندگی ، وزارت علوم تحقیقات و فن آوری ، سازمان صدا و سیمای جمهوری اسلامی ایران، سازمان حفاظت محیط زیست

پیشرفت طرح تا آذرماه سال 1383 (نوامبر 2004) :

طرح های اصلی	وضعیت فعلی و روند پیشرفت طرح	موانع / پیشنهادات
اموزش تکنسین ها و تعمیر کاران در مراکز معاینه فنی	**فقط يك آموزش محدود در ستاد مركزي معاينه فني خودرو ها وجود دارد.**	**نياز به آموزش هاي پيشرفته وجود دارد.** **براي خودروهاي جديد هيچ برنامه آموزشي موجود نمي باشد.**
آموزش پایه جهت تولید کنندگان وسایل نقلیه و تعمیرکاران	**پیشرفت کمی داشته است.**	**نياز به همكاري صنايع (خودرو سازي ، موتورسيكلت سازي و قطعه سازي) با وزارت صنايع ،شهرداري تهران و ساير سازمان هاي مسوول لازم و ضروري است.** **برقراري يك سيستم آموزشي براي تعمير كاران، تكنسين ها و**

		سازندگان قطعات به وسيله سازمان هاي آموزشي مسوول
آموزش پليس راهنمايی و رانندگی	**آموزشگاه پليس (دانشگاه پليس) تاسيس شده است.**	**نياز اساسي به بازآموزي و روز آمد كردن اطلاعات افسران وجود دارد.**
تنوير افكار عمومی	**اين كميته تاسيس شده است .**	**تهيه و راه اندازي يك برنامه اجرايي براي تنوير افكار عمومي اهداف برنامه روز هواي پاك در جهت فرهنگ سازي بايد در تمام طول سال ارايه و نهادينه گردد.**

3- مروری بر پیشرفت جریان برنامه جامع

3-1- نخستین محور : وسایل نقلیه جدید

تدوين و برقراري استاندارد ECER 83 برای تولیدات وسایل نقلیه سبک داخلی تا خرداد ماه سال 1382 با موفقیت صورت گرفت، که بسیار زودتر از زمان در نظر گرفته شده (بهمن ماه سال 1383)، (2005 میلادی) بود.
یکی از دلایل موفقیت کارخانه های خودروسازی و سازمانهای مرتبط با آنها در این زمینه، اتخاذ سیاست مناسب و داشتن زمینه کافی و مناسب فنی در این زمینه بوده است.

اگرچه رعایت استاندارد های مراحل مختلف ECER 83 به صورت واضح و آشکار تعریف نشده است، لکن رعایت استانداردهای فرض شده با نظارت سازمانهای حفاظت محیط زیست ، وزارت صنایع و معادن ، وشرکت بازرسي كيفيت و استاندارد صوررت می گیرد.
در رابطه با خودروهای سنگین ، اجرای استاندارد EU 2000 تلاش مضاعفی را از سوی تولیدکنندگان این نوع ماشین آلات میطلبد. ونیز به علت وجود تنوع و گوناگونی مدلهای ماشین آلات سنگین و تنوع در نوع

موتورهایی که در ایران تولید می شود ، بنظر میرسد که سنجش های جاری خودروهای دیزلی در برنامه جامع ده ساله عملی خواهد شد به نظر می رسد اکنون هیچ گونه توجهی در تعیین توانایی و ظرفیت تکنیکی کارخانجات انجام نشده است .
برای مثال ، با توجه به بازبینی استانداردها ، خودروهای تولید شده با تکنولوژی وارده از مرسدس بنز در دهه 70 میلادی به نظر می رسد موتورهای مذکور به طراحی مجددی نیاز دارد.
برای عملی شدن این کار به تحقیقات قابل توجهی نیاز است که نحوه استانداردسازی آنها را با معیارهای مورد نیاز بررسی و تعیین نماید.

در هر حال ظرفیت و توانایی های کارخانجات تولید خودروهای سنگین در ایران مشخص می باشد و باید برنامه امکان پذیری زمانی برای اجرای استانداردهای قابل قبول و جدی در این زمینه تهیه شود.

در رابطه با CO و HC توجه بیشتری در حال حاضرنیاز نیست زیرا که رویهم رفته سهم خودروهای دیزلی درآلودگی هوا بسیار ناچیزاست. حتی اگرجایگزینی تعدادی ازخودروهای دیزلی رقم بزرگی را تشکیل دهد انتشارآلاینده ها توسط ماشین آلات دیزلی حدودا" یک دهم آلایندگی خودروهای بنزیني می باشد ، هرچند که میزان زیادی از گازهای NOx, PM و SOx از خودروهای دیزلی ساطع میگردند.
در خصوصSOx ، بسیار مطلوب خواهد بود که در جهت کاهش میزان گوگرد درسوخت براي برآورد دقیق، سنجش هایی انجام شود تا ، میزان SOx خودروهای دیزلی مشخص شود و حد غیر مجاز آن ممنوع گردد.

ذکراین واقعیت که در اروپا، امریکا و ژاپن اخیرا" میزان مجاز برای SOx به زیرppm 50 می باشد در ایران این میزان 500ppm یا بیشتر است لیکن در حال حاضر با توجه به امکانات موجود قابل قبول می باشد.
در خصوص NOx هیچگونه راه حل مشخص در برابر انتشار آن توسط خودورهای دیزلی وجود ندارد، و بستگی به توسعه فنی و تکنیکی کشورهای پیشرفته دارد.

اجرای برنامه در جهت کاهش میزان انتشارآلاینده های موتورسیکلت ها بسیار سخت و دشوار است زیرا که هیچکدام از 100 شرکت تولید کننده در ایران توانایی مالی و فنی همکاری ایجاد آزمایشگاههای مجهز را بدون حمایت دولت ندارند. اما چنانچه الزام هاي قانوني مناسبي فراهم گردد و همکاري هاي مناسبي در جهت کار گروهي صورت گيرد مي تواند در احداث چنين مرکزي بسيار موثر باشد.

بنابراین، همکاری وسیعی بین صنایع موتورسیکلت سازی و سازمانهای مجری جهت سازماندهی برنامه های عملی در همین رابطه پیشنهاد مي گردد.

اجرای استاندارد ECER 49 برای مینی بوسهای وارداتی تا به حال عملی نشده است ، کلا این بخش به توجه زیادی نیاز ندارد زیرا تعداد آنها به دلیل برقراری مالیاتهای سنگینی برای مینی بوسهای وارداتی بسیار محدود است.

2-3- محور دوم : خودروهای مستعمل

1. در خصوص تبدیل سوخت به گاز طبیعی فشرده برای اتوبوسها ، کاربرد سیستم جرقه ای فعلي به جای موتورهای دوگانه سوز (گاز طبیعی فشرده و سوخت دیزلی) ممکن است تاثیر کارکردي منفي براي موتور این اتوبوس ها به وجود آورد.نظر به تعداد محدود ایستگاههای گاز طبیعی فشرده موجود در تهران ، ممکن است بیش از ده سال جهت توسعه تعداد مناسبی از ایستگاههای گاز طبیعی زمان نیاز باشد. بنابراین معرفی موتورهای دوگانه سوز جهت انعطاف بیشتر این برنامه پیشنهاد می شود.

2. تبدیل سیستم سوخت برای پیکانهای بیش از ده سال توسط سازمانهای مرتبط اجرا نشده است، اگرچه یک راه حل عملی در همین راستا باید شناخته شود.

3. در رابطه با آزمایشات اجرا شده درشرکت تحقیقات، طراحی و تولید موتور ایران خودرو (IPCO) و با قرارداد سازمان بهینه سازی مصرف سوخت (IFCO) ، تغییر سیستم کاربراتوری به انژکتوری در موقع اجرای پروژه صورت میگیرد. پروژه تغییر سیستم تا بحال اجرا نشده است، تیم مطالعاتی جایکا پروژه نمونه ای چهارم (PP4) را در همین راستا جهت تعیین و مشخص نمودن موانع موجود پروژه اجرا نموده است.

در جهت یافتن راه حلهای فنی ،نیازبه استفاده از یک دستور و قاعده مشخص احساس گردید ؛ مثل یک تجربه کاری در 8 شهرداری ژاپنی برای پیشرفت تغییر سیستم سوخت، که در این کشور تردد این خودروهای فرسوده نمی تواند بدون افزودن قسمت های کنترل انتشار الودگی صورت گیرد. جایگزیني خودرو هاي فرسوده از دیگر پروژه هاي برنامه جامع ده ساله مي باشد که نیازمند همت عمومي مردم و مسوولا ن است. در بدو امر تنش هایي

وجود خواهدداشت ليكن با پيش بيني هاي مناسب وبستر سازي درست از نظر ديدگاه هاي منافع عمومي، اقتصادي ، بهداشتي و زيست محيطي بيشرفت شاياني انجام خواهد گرفت.
لزوم تدوين سازوكاري مناسب در جهت جايگزيني و از رده خارج كردن و اسقاط خودروهاي فرسوده الزامي است.

3-3- محور سوم : حمل و نقل عمومی

کارخانجات داخلی همانند ایران خودرو و شهاب خودرو،با ظرفیت پذیری فنی و دارا بودن بودجه مورد نیاز برای برنامه ریزی و تولید اتوبوسهای CNG سوز اقدام نموده اند.
ایران خودرو دیزل برای تولید 200 اتوبوس CNG سوز از نوزدهم دی ماه سال 1382 (روز هوای پاک) و حدود 550 اتوبوس دیگر هم تا اوایل اسفند ماه سال 1382 برنامه ریزی نمود؛ اگرچه تحویل این خودروها به طور کامل تا به حال صورت گرفته است لیکن کمبود ها همچنان احساس مي شود. شهاب خودرو 100 دستگاه اتوبوس CNG سوز را تولید نموده است.

قابل ذکر است بودجه لازم جهت تولید 1000 دستگاه اتوبوس CNG سوز توسط نهاد ریاست جمهوری اختصاص داده شده است.

بر طبق اطلاعات موجود از متروی تهران ، خطوط 1، 2 و 5 در حال فعالیت میباشند علاوه براین در یک برنامه ریزی 10 خط مترو و خطوط 1، برای حمل و نقل داخلی شهر تهران اولویت بندی شده است.
بر اساس این اولویت بندی ها توسعه خطوط شماره 1و2 در حال انجام می باشد. دو ایستگاه خط شماره 2 تا آخر زمستان 1382 فعال شده اند.

خط شماره 3 و 4 بعد از اتمام خطوط 1و2 ساخته خواهد شد كه در راستاي برنامه جامع ده ساله نيزمند شتاب بيشتري است.

4-3- محور چهارم : سوخت

همانطور که در محور دوم مطرح شد، تبدیل سوخت خودروها به گاز طبیعی فشرده با مشکلات زیادی روبروست که نیازعمده ای به افزایش ایستگاههای CNG دارد.

از سوی دیگر ، در مورد تاکسی ها به نظر میرسد که برنامه آن در حال پیشرفت می باشد.

این موفقیت وابسته به سازگاری سیستم سوخت دوگانه (بنزینی و گازی) می باشد.

5-3- محور پنجم : برنامه معاینه فنی و تعمیرگاهها

ایجاد امکانات عملیاتی صورت گرفته است و به طور کلی این سیستم در مراکز معاینه فنی به صورت کافی و مناسبی ایجاد شده است.

در این راستا شهرداری تهران و تمامی ارگانها در حال فعالیت میباشند. (یکی دیگر تا دی ماه سال 1382اضافه شده است.) ظرفیت کلی مراکز معاینه فنی هرروز در حدود 3900 دستگاه می باشد. بر طبق جلسه کمیته اجرایی در دی ماه سال 1380 ، هماهنگی لازم در بین سازمان محیط زیست ، شهرداری تهران و پلیس راهنمایی و رانندگی برای الزامی نمودن تمامی خودروها جهت گرفتن مجوز از این مراکز صورت گرفت؛ که ازجمله دست آوردهای جالب توجه برنامه جامع می باشد.

اگرچه با مشکلاتي در برنامه مراجعات، سرعت عملیات ، ظرفیت ها، توسعه منابع انسانی تکنسین ها و مهندسان در کارگاه های مراکز روبرواست.

اولین مشکل موجود کمبود مراجعه به این مراکز می باشد. بیشتر دارندگان وسایل نقلیه به مراکز معاینه فنی مراجعه ننموده اند و برگه معاینه فنی را دریافت نکرده اند.

اگرچه 199131 خودرو در نیمه نخست سال 1383 به مراکز معاینه فنی مراجعه کرده اند ولي در حال حاضر این مراکز با ظرفیت 20% فعالیت می نمایند و با توجه به تعداد این وسایل نقلیه در تهران این تعداد تنها بخش ناچیزي از خودروهايي است که باید به این مراکز مراجعه نمایند.

در این راستا تیم مطالعاتی جایکا پروژه نمونه ای پنجم(pilot project 5) را برای توسعه هر چه بیشتر مراکز معاینه فنی خودروها مخصوصا" در مورد دارندگان خودروهای فرسوده، و مشارکت آن ها که به عنوان بزرگترین آلوده کننده در نظر گرفته شده است پیشنهاد کرده ،و به صورت موردي اجرا نمود .

به علاوه در يك ابتکار عمل مناسب از سوي دولت ایران ، جریمه های خودروهای در حال تردد که هنوز به مراکز معاینه فنی مراجعه ننموده اند به 70000 ریال در سال 1383 افزایش یافت و شمار پلیس های راهنمایی و رانندگی با يك رشد مناسب همراه گردید که در جهت تقویت الزام به رعایت قوانین و مقررات راهنمايي و رانندگي بود. سپس يك هماهنگی مناسب بین ستاد معاینه فنی خودرو تهران و پلیس راهنمایی و رانندگی در این زمینه صورت گرفت که نقطه عطفي در جهت برقراري سامانه هماهنگ معاینه فني خودرو ها به همراه الزام دارندگان وسایل نقلیه به مراجعه گردید.

با وجود این تلاش ها و کوشش ها ، تلاش بیشتر سازمانهای مسوول در اجرای قانون اجباری و محرک های مالی وهمکاری سازمانهای عمومی مرتبط نظیر ستاد معاینه فنی، پلیس راهنمایی و رانندگی و تعمیرگاهها جهت افزایش سرعت عملیات موثرخواهد بود.

نکته دوم آن که ، در حال حاضر ظرفیت کلی(6) مرکز معاینه فنی در شهر تهران وجود دارد که بیش از نیاز مراجعه کنندگان است ، اما اگر همه خودروها برای تقاضای مشمول معاینه فني مراجعه نمایند دو مرکز دیگر علاوه بر این مراکز مورد نیاز است که یکي از آن ها هم اکنون در حال احداث است.
با وجود این نیاز در نظر گرفته شده امکانات مراکز معاینه فنی خودروی خصوصی ، یک تجربه مناسب و الگویي است که به عنوان یک فعالیت موثر در ژاپن صورت گرفته است و نتایج آن موجود مي باشد.

سوم ، موضوع دیگری که دارای فایده هاي بسیار زیادی در مهارت های فنی جهت تعمیر و تنظیم در کارگاهها علا وه بر تشویق عموم مردم به مراجعه آموزش تکنسین هاي این بخش و روزآمد کردن آن ها جهت خدمت رساني بهتر به مراجعین و بالابردن سطح رضایت عمومي را به همراه خواهد داشت که این مساله در چهارچوب بخش هفتم (آموزش) با جزییات بیشتري شرح داده شده است. کارگاه هاي آموزشي در این مساله یک مهم برای آماده سازي این افراد براي ارایه " خدمات سریع " به دارندگان خودرو(مراجعین مراکز معاینه فني خودرو) به ویژه کساني که خودرو آن ها در مراجعه اول رد شده است را آسان کرده و به رضایت هر دو طرف و نتیجه گیري بهتر منتهي خواهد شد.
به هر حال تکنسین های معاینه فنی مي بایست پس از تکمیل این گونه دوره هاي آموزشي باید به همکاران خود این داده ها را منتقل نمایند.
در راتاي رسیدن به این هدف پنج نفر از تکنسین های مراکز معاینه فنی خودروهاي تهران به کشور آلمان در سال 1381 جهت آموزش عملیاتی در مراکز معاینه فنی خودروهاي کشور آلمان فرستاده شدند.

به هرحال تیم مطالعاتی جایکا طرحی بعنوان پروژه پایلوت ششم (Pilot Project 6) برای آموزش تکنسین های مراکز معاینه فنی و کارشناسان تعمیرگاه ها در نظر گرفته و اجرا نموده است . پروژه پایلوت ششم اثرات برنامه آموزشی داخلی و وظایف شناخته شده جهت ایجاد دستورالعمل هاي آموزشي در مراکز معاینه فني را مورد ارزیابی قرار داده است.

6-3- محور ششم : مدیریت ترافیک

به دنبال تصویب دولت، به شهرداری تهران وظایفي را جهت فراهم آوردن امکانات برای تقاطع ها و خیابانها نظیر چراغ های ترافیکی هوشمند (حداقل در 300 تقاطع) را در اواخر سال 1381داده شد و نصب پارکومترها هم به عنوان آخرین مرحله از این طرح قرار گرفته بود. علاوه بر این با هماهنگی سازمان حمل و نقل ترافیک تهران ، فعالیت های اصلی جهت روان ساختن جریان ترافیک و توسعه اصلاح هندسی خیابانها و پیاده روها صورت گرفت.(براساس جلسه کمیته اجرایی در اواخر سال 1380(ژانویه سال 2002 میلادی).

شورای عالی ترافیک و سازمان حمل و نقل ترافیک تهران یک بودجه پویای 9،690 میلیون ریالی را برای نصب چراغهای ترافیکی هوشمند و 1،500 میلیون ریالی جهت نصب هر پارکومترها در سال مالی 1382-1381 اختصاص داد.
محدودیت نصب چراغهای ترافیکی هوشمند و پارکومترها مربوط به بخش مالی می باشد که سازمان حمل ونقل ترافیک شهر تهران به دنبال دریافت وام با بهره پایین جهت اجراي این طرح ها مي باشد.

برای اجرای سنجش های مدیریت ترافیکی و افزایش سهم پلیس راهنمایی و رانندگی آموزش به روز و جامع مورد نیز است.
پس از فعالیت ها و تلاش هایي که در جهت روزآمد کردن اموزشگاه پلیس صورت گرفت ، به زودی مهندسی ترافیک و مدیریت ترافیک به عنوان یک مبحث اساسي و مهم در آموزشگاه پلیس آموزش داده خواهد شد.
به طور کلی مراحل عالی علمی دراین آموزشگاه آموزش داده می شود و در حدود 20 موضوع آموزشی در طول یک سال آموزش داده می شود . طول مدت دوره آموزشی شامل 2 نیم سال تحصیلی در هر سال می باشد. مواردی که برای پیشرفت و بهبود کیفیت اموزش در نظر گرفته شده است عبارتند از:

- شرکت کارآموزان در همایش های تخصصی
- شرکت کارآموزان در کارگاههای آموزشی
- ملاقات از سازمانهای حمل و نقل ترافیک و بخشهای مرتبط آن توسط کارآموزان
- دیدار از مراکز معاینه فنی توسط کارآموزان، و
- بازدید کارآموزان از صنایع خودروسازی

برنامه های ذکر شده مدیریت ترافیک در آموزشگاه پلیس به طور جدی توصیه مي شود.

7-3- محور هفتم : آموزش

یکی از برنامه های در حال اجرا افزودن آگاهی عمومی و تنویر افکار عمومی توسط کمیته اجرایی با همکاری اداره کل محیط زیست استان تهران می باشد.
مراکز مهار(مرکز هماهنگي اطلاع رساني آلودگي هوا) روزانه وضعیت آلودگی هوا را بر اساس استانداردهای منطبق با شاخصهای استاندارد آلودگی ارائه می دهد.

فعالیت دیگر آگاهی عمومی برقراری یک جلسه در تهران با شرکت متخصصان محیط زیست و مدیران و مسوولین شهر در خرداد ماه سال 1379-1378 (ژوئن سال 2000) بوده است.

برپایی روز هوای پاک ازدي ماه سال 1376 یکی از فعالیت مهم آموزشی دیگر کمیته اجرایی می باشد. این مراسم در دی ماه سال 1382 با هماهنگی و همکاری تمامی سازمانهای مرتبط، سازمان های غیر دولتی و دیگر بخش های مرتبط در کشور برگزارشده است.
مراسم مهم دیگری درجهت پیشرفت آگاهی زیست محیطی کودکان و نوجوانان در وزارت کشور برگزار شد. از دیگر فعالیت های برگزار شده یک برنامه آموزشی تورملی دوچرخه سواری از 24 شهر به شهر تهران ، ایجاد کارگاهی توسط سازمانهای غیر دولتی، اجرای برنامه هایی توسط تولید کنندگان خودروها با همکاری شهرداری تهران، افتتاح دو ایستگاه گازی، کاشت حدود 29000 درخت در شهر ، انجام امور تون آپ خودرو توسط تعمیرگاه های خصوصی بطور رایگان است .

یکی از معیارها یا اهداف ، اجرای طرح روز هوای پاک در سال اخیر ، هشدار و آگاهی یا آگاه ساختن مردم در مورد تاثیر هوای آلوده بر روی قشر جوان و کودکان می باشد و اگرچه پیشرفت در روند این طرح نیاز به صرف وقت زیاد می باشد اما تکرار در اطلاع رسانی برای ایجاد فرهنگ یا فرهنگ سازی را نباید نادیده بگیریم.
در این زمینه احتیاج به تبلیغات گسترده ای می باشد . در خلال اجرای این فعالیت ها یا اقدامات باید از راهبردها و یا تجربیات سودمند کشورهای دیگر کمک بگیریم. و با حمایت و بهره گرفتن از این دست آوردها می توان اقدامات موثری در زمینه اطلاع رساني و افزایش اگاهي مردم نسبت به کاهش آلودگی هوا انجام داد و از جمله : تعویض خودروهای فرسوده با خودروهای نو، معاینه فنی خودروها و افزایش استفاده از وسایل نقلیه عمومی .

یکی از مهمترین پروژه ها برای تثبیت و یا اجرای بهتر و موثرتر این طرح ، آموزش پایه ای به تولیدکنندگان خودرو و تعمیرکنندگان آن می باشد. براساس گزارشات موجود ، هر دو ارگان شهرداری تهران و تولیدکنندگان خودرو احتیاج به همکاری در این زمینه دارند. در این بین ممکن است نیاز به همیاری دیگر سازمانهای وابسته برای انجام یا استفاده از منابع موجود احساس شود.

در میان سایر پروژه ها ، هر دو مورد یعنی آموزش نیروی پلیس راهنمایی و رانندگی (پلیس ترافیک) و مراکز معاینه فنی خودرو لحاظ شده است، و کلیه پیشنهادات موثر برای تدارک آموزش بیشتر به ترتیب در برنامه های پنجم و ششم مدنظر قرار گرفته است.

Appendix M Website

A website was developed in Phase II to help improve air quality management in Tehran by establishing a portal site for the future air quality management in Tehran. To do that, the website incorporates various pieces of information such as general information and activities of the Study, DOE, the Executive Committee, and air quality of Tehran. It can be found here (http://tehranair.irandoe.org/).

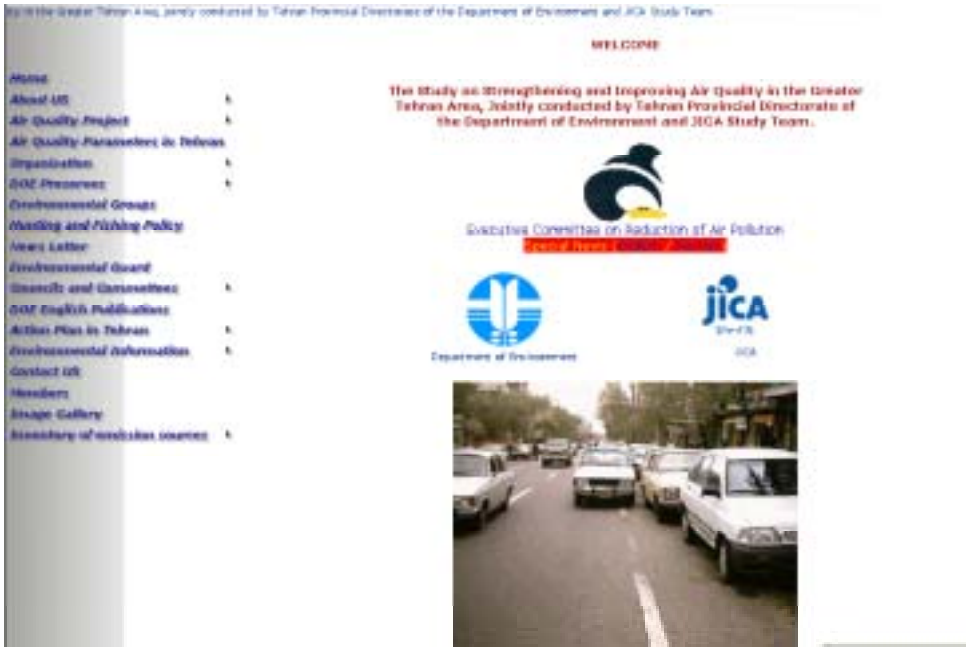


Figure M.1 Website Homepage

The portal site is an entrance to the homepage of the Executive Committee and is separated into pages for Executive Committee members and the public.

The Executive Committee pages are password protected. Individual IDs and passwords are provided to the members, who can access all contents. The EC Secretariat manages these IDs and passwords. The contents for the members include:

1. Executive Committee meetings minutes that can be searched by subject and topic;
2. Monthly newsletters;
3. Air quality monitoring data and metrological (in future); and
4. Progress of Action Plans (in future).

The main objective of the public pages is to disseminate information on activities by DOE and the JICA Study Team. The contents for the public include:

1. General information and activities of DOE;
2. Organizational structure and information of DOE;
3. General information and activities of the study;
4. Monthly newsletters of the study;

5. Guidebooks for inventory preparation and updates
6. Introduction of various councils and committees of DOE;
7. List of English publications by DOE;
8. Other activities on air pollution including the Executive Committee on Air Pollution Reduction and other studies and action plans;
9. Photographs of traffic and nature; and
10. White Paper (in future).

The structure of the Website is illustrated in Figure M.2.

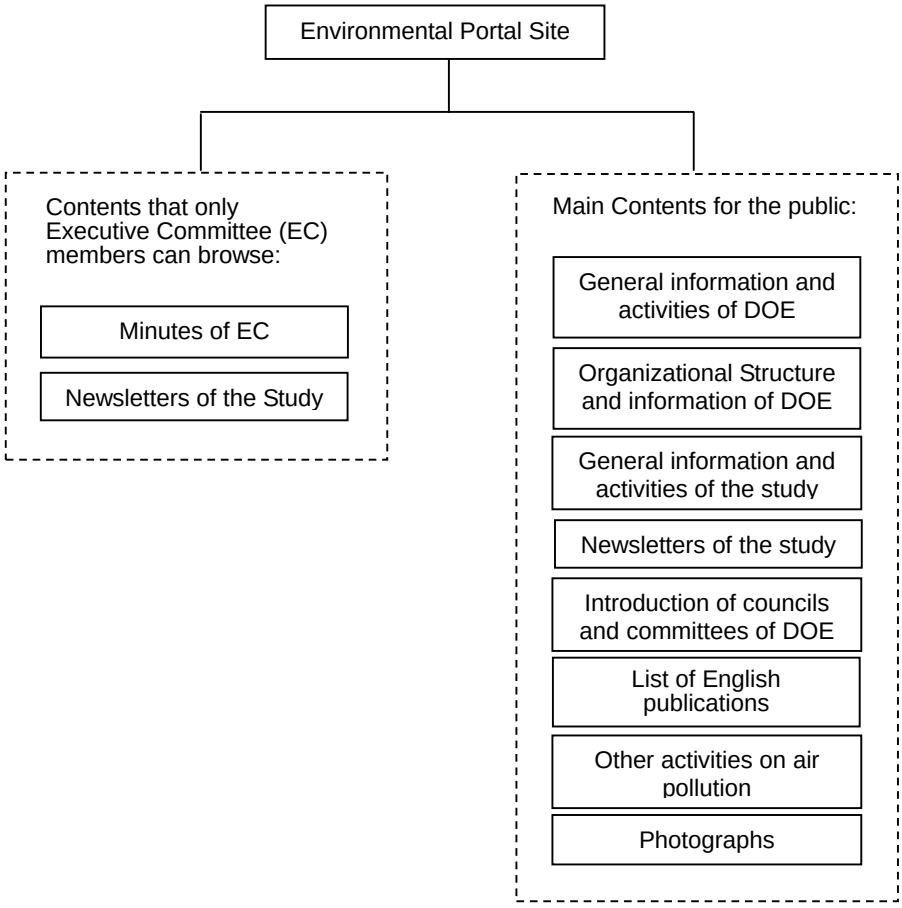


Figure M.2 Structure of the Website

Appendix N Project Design Matrix

Table N.1 Project Design Matrix of the Inventory Preparation for GTA

Narrative Summary	Key Performance Indicators	Monitoring and Evaluation	Critical Assumptions/Risks
Project Impact Enhance environmental compliance of factories Promote economic development by enhancing investment and reducing risks and uncertainties about future costs for environmental remediation.	Increased investment for environmental management	Investment report Interview survey for individual companies Performance report by DOE-TPD	**Strategic Goal** Protect humanity in Tehran and the country from potential threat resulted from degraded air quality Government remains committed to air pollution management
Objective 1. Enhance DOE-TPD's capacity to manage emission sources within GTA by using the database as a decision support tool, 2. Improve DOE-TPD's capacity to formulate and assess air management policies.	1. Archive data entry completed by the end of 2005 2. Data coverage over the entire province by 2010. 3. Targeted intervention proposed and implemented.	1. White paper 2. Internal report	1. Consolidate a cooperative environment between the DOE-TPD laboratory and the Executive Committee, in which central decision makers are empowered with quantitative analytical tools. 2. The same system extended to other major cities. 3. Other modules such as simulation, cost-benefit analysis incorporated into the system.
Output 1. A task team created in DOE-TPD with technical expertise on managing air pollution, 2. Mobile Source Inventory database completed, 3. Construction of stationary emission source inventory incorporating a preventive measure initiative.	1. A team organized specifically for inventory preparation by the middle of 2004, 2. Development of a new application format by the middle of 2004, 3. Inventory database installed in DOE-TPD by the end of 2004	1. JICA's Newsletter 2. JICA's Final Report	1. The task team incorporated into DOE-TPD's organizational structure with high staff stability; 2. Annual budgets for maintaining and further strengthening the inventory task team earmarked; 3. Fiscal support to operation of the activities pertaining to the inventory extended; 4. Opportunity for capacity building toward improved air pollution management extended.

Narrative Summary	Key Performance Indicators	Monitoring and Evaluation	Critical Assumptions/Risks
Activities 1. Organizational development DOE-TPD for stationary and mobile inventory management 2. Capacity development for DOE department in charge of stationary and mobile inventory database 3. Institutional improvement in air pollution permit system 4. Development of database (Designing structure, data collection and encoding)	**INPUT** <u>Iranian side</u> Task Manager Stationary Management Specialist Mobile Management Specialist <u>Japanese side</u> Stationary Management Expert Mobile Management Expert Local consultants		**Preconditions** Full collaboration between DOE-TPD and JICA, Assignment of skilled counterpart to the project

Appendix O Former Version of Application Format in DOE-TPD Air Pollution Permit System

IN THE NAME OF GOD
PRESIDENT
TEHRAN PROVINCIAL DIRECTORATE
DEPARTMENT OF ENVIRONMENT

Environmental questionnaire for industry, commercial and agricultural units

Name of Unit	
Name of Chief	
Central Office Address	
Address of Unit Tel/Fax:	
Type of Operation	Number of Employee: _____ Ownership: 1: Governmental 2: Semi governmental 3: Private Type of Activity: 1: Throughout the year 2: Seasonal Number of Full Employee: _____ Number of Seasonal Employee _____ Working hour: _____ Raw Material (Kind and amount of material per year) Products (Kind and amount of products per year)
	Raw Material Storage: 1: Storehouse 2: Open Field Products 1: Storehouse 2: Open Field

<table>
<tr><td>Location Information</td><td>

Location:

1: Outside city service boundary 2: Outside village service boundary
3: Outside legal boundary 4: Industrial area
5: Residential area 6: Commercial area

Distance from:

Environmental limit: _____ Residential center: _____
Educational center: _____ Military center: _____
Highway transit: _____ Main road: _____
Park: _____ Lake: _____
Sea: _____ National Park: _____
Protected area _____ Natural Monument _____
Wildworld shelter _____ Permanent river: _____
Subterranean canal _____ Drinking water well _____
Agri-water source _____ Indp. water source _____

</td></tr>
<tr><td>Air Pollution</td><td>

Electricity _____ kw Gas oil _____ L/year
Mazot _____ /y White oil _____ L/y
Natural Gas _____ m^3/y

Stack Gas:

Number of Stack _____ Height _____
Sampling Yes or No
Flow rate _____ m/s Gas Temp. _____ d C
Wind Speed _____ m/s Prevailing direction _____
Noise Yes or No
Haring the sound from _____ m
Vibration
Radiation
Control devices
If control device is available, describe the system, efficiency

</td></tr>
<tr><td>Waste Information</td><td>

Waste component
Solid / Flammable liquid / Toxic and Hazardous material / Corrosive
Amount of waste _____ kg/year

</td></tr>
</table>

Waste Disposal	**Storage:** Special site / Container / Disposal to open field Collection By unit responsible / by municipality / by private sector Time of collection Daily / weekly / monthly How it is disposed Burning / recovery / saling / landfill / silk warm nursery / transfer to permitted site
Water Pollution	**Water supply source:** City / well / River / Lake / others Amount of water consumption: _____ m^3/year Amount of Industrial water produced _____ m^3/year Amount of human waster _____ m^3/year Equipped by treatment facility Yes/No If yes, describe the system
Location of the unit	MAP
Production Procedure	

Undertakings

No. of Birth certificate
Name of father
Name ad family name
From

By verifying all written answers in this questionnaire, I undertake to follow all DOE-TPD standards and regulations in all part of my activities and if not, I don't have any right to DOE-TPD action. Also I should compensate all environmental real person and legal persons.

Expert comments

Appendix P Proposed Application Format in Air Pollution Permit System

ISLAMIC REPUBLIC OF IRAN

DEPARTMENT OF ENVIRONMENT

TEHRAN PROVINCE DIRECTORATE

INDUSTRIAL, COMMERCIAL, AND AGRICULTRAL ACTIVITIES

ENVIRONMENTAL APPLICATION FORM
AND
ENVIRONMENTAL IMPACT QUESTIONNAIRE

GENERAL INFORMATION

Name				
Plant	**Address:** **Phone:** **Facsimile:** **Electronic Mail:**			
Head Office	**Address:** **Phone:** **Facsimile:** **Electronic Mail:** **Website:**			
Executive Person's Name and Title				
ISIC Code				
Ownership	**Gov't**	**Private**	**Mixed**	**Cooperatives**
No. of Employees	**Permanent:**		**Seasonal:**	
Number of Shifts				

RAW MATERIALS

Substance	**Amount (t/y)**	**Unit**	**Storage Facilities**		**Remarks**
			Open Area	**Storehouse**	
1.					
2.					
3.					
4.					
5.					
6.					
7.					

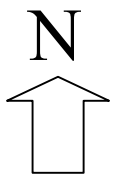
PRODUCTS

Name/Type	**Amount (t/y)**	**Unit**	**Storage Facilities**		**Remarks**
			Open Area	**Storehouse**	
1.					
2.					
3.					
4.					
5.					
6.					
7.					

PRODUCTION LINE FLOW DIAGRAM

LOCATION DETAILS

SCHEMATIC AREA MAP



Altitude:

Latitude:

Longitude:

Master Plan Zone	**Industrial**	**Commercial**	**Residential**	**Others**

Distance From (m)	**Land Use**	**Distance (m)**	**Land Use**	**Distance (m)**

POLLUTION SOURCES

Pollution Type	Yes*	No	Remarks
Air Pollution			
Water Pollution			
Solid Wastes			
Special Wastes			
Noise Pollution			

* Please fill in one data sheet for each pollution source. The data sheets must be signed by the visiting official and annexed hereto.

COMMENTS BY VISITING DOE EXPERT

Name: Position: Date: Signature:

LEGAL STATEMENT BY UNIT RESPONSIBLE PERSON

In my capacity as Unit Owner/Managing Director/ Legally Responsible Person, I verify in full the contents of this application form and undertake to fully observe all TPD standards and regulations. In case of any breech incidents, I shall maintain no right to TPD action. I shall compensate for any environmental and other damages to any real or legal persons and/or environmental assets duly and fully.

Name Signature Date Position:
Date: Signature:

Subscribes and sworn to before me on this _____ day of _____, _____

Name: Signature Date

My authorization as a Notary of the Province of Tehran will expire on _____

ANNEX I: AIR POLLUTION SOURCE DATA SHEET (Gaseous Emission)

FACILITY INFORMATION

Facility ID in the Factory	Classification of Facility*	Date of Installation	Number of the same facility in the factory

FLOW RATE

Maximum Flow Rate of Gas	Drv (m^3N/h)	
	Wet (m^3N/h)	

STACK

		P.1.0.1	Stack 2	Stack 3	Stack 4
ID					
Material of the stack					
Height (m)					
Diameter	Diameter				
	Length (m)**				
	Width (m)**				
Gas Temperature					
Gas Velocity					
GEO Info.	Latitude				
	Longitude				

AIR POLLUTANTS ABATEMENT DEVICES (EFFICIENCY)

	Device 1	Device 2	Device 3	Device 4
Device ID				
SO_2 (%)				
CO				
NO_2 (%)				
TSM (u/m3)				
Others				

OPERATION SCHEDULE OF THE FACILITY

Current Conditions	1. Operational 2: Under construction 3: Suspension of operation 4: Termination of Operation 5:Other ( )					
Annual Operation Hours						
Months of Operation	1st	2nd	3rd	4th	5th	6th
	7th	8th	9th	10th	11th	12th
Regular Operation time	Start from :			Stop at :		

EMISSION RATE

Gas Emission Rate (Dry: m^3N/h)			
Oxygen content	%	Water content	%
Concentration of Gas	SO_2 (%)		
	CO		
	NO_2 (%)		
	TSM (u/m3)		
	Others		

FUEL/ENERGY DESCRIPTION

Fuel Type	Amount of fuel/year *	Property of fuel		
		S (%)	Specific gravity	Calorific value (kJ/kg, kJ/m^3N)
Electricity				
Natural Gas				
Heavy oil				
Gas Oil				
Kerosene				
Gasoline				
LPG				

*: Liquid: (kl) Solid and LNG (ton) Gas: (10^3m^3N) Electricity (10^3kWh)

RAW MATERIAL (LIMITED TO THOSE AFFECT EMISSION SOOT AND SMOKE)

		Material 1	Material 2	Material 3	Material 4
Kind of Material					
Percentage					
Ingredients in raw material (%)	S				
	F				
	N				
	Cl				
	Br				
	Others ( )				
Daily Consumption					
Annual Consumption					

ANNEX II: WASTE MANAGEMENT DATA SHEET

WASTE MANAGEMENT

		Solid	Flammable liquid	Toxic and Hazardous material	Corrosive
Amount of waste (kg /year)					
Storage	1: Special site 2: Container 3: Disposal to open field				
Collection	1: By unit responsible 2: by municipality 3: by private sector				
Time of collection	1: Daily 2: Weekly 3: Monthly				
How it is disposed	1: Burning 2: Recovery 3: Selling 4: Landfill 5: Open Air Storage 6: transfer to permitted site				

ANNEX III: WATER POLLUTION DATA SHEET

Water source		1: City 2: well 3: River 4: Lake 5: others			
Amount of water consumption: (m^3/year)					
Amount of human waster (m^3/year)					
Industrial Waste water	Amount of Industrial water discharge (m^3/year)				
	Discharge Water Quality	**BOD**	**COD**	**NO_3**	**PO_4**
	Equipped by treatment facility 1: Yes 2: No				
	If Yes, Efficiency				
If yes, describe the system					

ANNEX IV: NOISE POLLUTION DATA SHEET

Type (name) of the equipments:			
Capacity:			
Establishment location:	Closed site….. Open site…….		
Work time: hours/day	from…….to……...		
Noise intensity level:		Night time	Day time
	Inside the saloon		
	Outside the saloon		
	1m distance		
	5m distance		