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IMPLEMENTATION COMPLETION REPORT

ISLAMIC REPUBLIC OF IRAN

TEHRAN TRANSPORT EMISSIONS REDUCTION PROJECT
(GET GRANT TF028642)

June 1, 1998

Infrastructure Development Group
Middle East and North Africa Region

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CURRENCY EQUIVALENTS

Irani Rials equivalent of US\$1

	Floating Exchange Rate (annual averages)	Export Exchange Rate
1994	1749	2000
1995	1748	2350
1996	1751	-
1997	1754	3000

ABBREVIATIONS AND ACRONYMS

AQCC	Air Quality Control Company (a subsidiary of the Municipality of Tehran)
GEF	Global Environment Facility
GET	Global Environment Trust
GHG	Greenhouse Gases
GOIRI	Government of the Islamic Republic of Iran
IJV	International Joint Venture of Consultants
IPE	International Panel of Experts
PMU	Project Management Unit
SDR	Special Drawing Rights
TCTTS	Tehran Comprehensive Transportation and Traffic Studies Company (a subsidiary of the Municipality of Tehran)
TERP	Tehran Transport Emissions Reduction Project
TOR	Terms of Reference
UNDP	United Nations Development Program

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ISLAMIC REPUBLIC OF IRAN
GET - IRAN TRANSPORT EMISSIONS TRANSPORT

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MAP : IBRD No. 29378

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ISLAMIC REPUBLIC OF IRAN
TEHRAN TRANSPORT EMISSIONS REDUCTION PROJECT
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IMPLEMENTATION COMPLETION REPORT

PREFACE

This is the Implementation Completion Report (ICR) for the Tehran Transport Emissions Reduction Project, in the Islamic Republic of Iran, for which Global Environment Trust (GET) Grant Number TF028642 in the amount of SDR 1.5 million equivalent was approved on October 5, 1993, and made effective on January 3, 1994.

The Grant was closed on December 31, 1997. The project was expected to be completed by June 30, 1996, but at the request of the Recipient, the closing date was extended twice, from the original closing date of December 31, 1996. As of January 23, 1998, there was an undisbursed amount of SDR 5790.90 (equivalent to US\$ 7,768.00) that was cancelled on the same day.

The ICR was prepared by Claude Archambault (MNSID) and was reviewed by Jean-Claude Villiard, Director (MNSID). The Recipient provided comments, as well as its own completion report that is included as Part III to the ICR.

Preparation of this ICR was begun during the Bank's final supervision mission of June 27 - July 2, 1997. It is based on material in the project files. The Recipient contributed to the preparation of the ICR by (a) offering views reflected in the mission's aide-mémoire attached under Appendix A to the ICR; (b) preparing its own evaluation of the project's initial preparation and execution; and (c) commenting on the draft version of the ICR.

EVALUATION SUMMARY
TEHRAN TRANSPORT EMISSIONS REDUCTION PROJECT
(GET GRANT TF028642)

ISLAMIC REPUBLIC OF IRAN

Introduction

1. The Tehran Transport Emissions Reduction Project (TERP) was one of the first projects approved by the GEF board after it was established following the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. Identified and appraised as a pilot project, with a Grant amount of SDR 1.5 million¹, it was rated **satisfactory** from the following points of view: (i) Bank performance; (ii) Grant Recipient performance; and (iii) assessment of project outcome. The project is deemed **sustainable**, but the current US trade embargo against Iran may adversely affect future data collection and analysis of air pollutants in the city of Tehran.

Project Objectives

2. Original Project Objectives. The main objective of the project was to assess measures that would reduce greenhouse gases (GHG) emissions from urban transport operations in the city of Tehran, and improve local air quality.

3. More precisely, the project was to: (i) assess measures, including efficient pricing of inputs and urban transport services, that would reduce GHG emissions from vehicular traffic; (ii) identify a schedule of measures to achieve a target air quality improvement; (iii) quantify the costs of various interventions to reduce GHG and local air pollutant emissions from urban transport in a setting characterized by proven technologies that are typical of non-industrialized and newly industrialized countries; and (iv) assist the Grant Recipient² in defining urban transport policies which are environmentally sustainable from a local and from a global standpoint.

4. Achievement of Project Objectives. By and large the project has achieved its stated physical and institutional objectives: (i) AQCC has commissioned a comprehensive study that modeled traffic flows and air quality in Tehran, to assess measures that could reduce GHG emissions from vehicular traffic; (ii) it prepared an Action Plan to reduce PM-10 and GHG, and to improve air quality in Tehran; (iii) it identified those actions for which the municipality would be responsible, that could reduce both PM-10 and GHG by 38 percent by the year 2015, as compared to a business-as-usual scenario; and (iv) it prepared a strategy, based on a set of cost-effective measures, to reduce transport emissions in the short (0-5 years), medium (5-10 years)

¹ Equivalent to about US\$ 2.1 million, with a similar contribution from the Recipient.

² The Bank entered into a Global Environment Trust Grant Agreement with the Government of the Islamic Republic of Iran (GOIRI), and into a Project Agreement with the Municipality of Tehran.

and long term (10-20 years). The Recipient has prepared a detailed action plan as the outcome of the study.

Implementation Experience and Results

5. The project was successfully completed, and the Municipality of Tehran has indicated its commitment to implement the Consultants' major recommendations. It has also instructed Air Quality Control Company (AQCC), a subsidiary of the Municipality, to take appropriate measures to execute the Implementation Plan.

6. The project suffered some delays, and the closing date was extended twice, from the original date of December 31, 1996 to the final closing date of December 31, 1997. At the end of June 1997, the Recipient had spent a total of Rls 6.1 billion, approximately US\$ 2.1 million at the current exchange rate. At the project closing date, there was an undisbursed amount of SDR 5,790.90 (corresponding to US\$ 7,768.00), and this amount was canceled on January 23, 1998.

7. Key Factors Affecting the Project. Two major factors have had a major influence on the project: (i) the Government of Iran is reluctant to increase gasoline and diesel prices³, a measure seen as a prerequisite to induce vehicle owners to reduce their fuel consumption, and to promote urban transit in order to improve air quality in Tehran; and (ii) implementation delays occurred mainly because the original project schedule was unrealistic, and the Recipient was unfamiliar with the Bank's procurement and disbursement procedures. In spite of these problems, the overall success of the project can be attributed to the quality of AQCC's management team and the fact that it was closely associated with all phases of the project.

8. Bank's and Recipient's Performance. The Bank identified and prepared one of the first GEF projects approved by the board. It provided support to the Recipient throughout the course of the project, and it contributed to local institutional development. As the project management agency, AQCC's performance was **satisfactory**.

9. Assessment of Project Outcome. The project is rated as **satisfactory**, since it has achieved most of its objectives, and is expected to contribute to strengthening AQCC as the agency responsible for monitoring and improving air quality in Tehran.

Summary of Findings, Future Operations, and Key Lessons Learned

10. Project Implementation Experience. The early decision to have one agency rather than three responsible for project implementation was a major factor in the success of the project. However, more time should have been allocated to prepare the terms of reference, analyze proposals, and negotiate a contract. In addition, the Terms of Reference, prepared by the IPE, addressed concurrently too many objectives that were not necessarily relevant to evaluate the cost effectiveness of various measures to abate transport related emissions in Tehran and to decrease GHG production.

11. Project Sustainability. The project is deemed **sustainable**, in view of the commitment of AQCC and the municipality of Tehran to ensure its success. The Government of the Islamic Republic of Iran (GOIRI) has not shown the same level of commitment, and it is doubtful that it

³ Currently, these prices are much lower than border prices, e.g. US\$ 0.05 per liter for regular gasoline, and less than US\$ 0.02 for diesel, while the border price is about US\$ 0.11 per liter.

will take the necessary measures to reduce GHG in a significant way. Also the current US trade embargo against Iran will prevent the Recipient from acquiring spare parts for the pollution monitoring equipment that was purchased through the Grant, but this is not viewed as a major threat to the sustainability of the project.

12. Lessons for Future Projects. Three major lessons can be derived from this project: (i) a strong commitment is needed at the national level, and not only at the local or regional level, since policies such as fuel pricing have a major impact on the emission and/or reduction of GHG; (ii) the GEF goals of reducing GHG were not the first priority of the Municipality of Tehran, which was more interested in developing methods to reduce particulate matter (PM-10) in the atmosphere; in the future, more attention should be paid to the needs of the Recipient, and they should be recognized in the project design; and (iii) there is a need to collect a large quantity of data over as long a period as possible, to model both the traffic patterns in the City, and the air pollution dispersion patterns.

ISLAMIC REPUBLIC OF IRAN
TEHRAN TRANSPORT EMISSIONS REDUCTION PROJECT
(GET GRANT TF028642)

IMPLEMENTATION COMPLETION REPORT

**PART I: PROJECT IMPLEMENTATION ASSESSMENT
FROM THE BANK'S PERSPECTIVE**

A. Statement / Evaluation of Objectives

1. The Tehran Transport Emissions Reduction Project (TERP) was funded by the Global Environment Trust (GET). It was executed by the Municipality of Tehran through a Project Agreement with the Bank. The Municipality in turn entrusted one of its subsidiaries, Air Quality Control Co. (AQCC), to act as the Project Management Unit (PMU).

2. Project Objectives. The main objective of the project was to assess measures that would reduce greenhouse gas (GHG) emissions from urban transport operations in the city of Tehran, and improve local air quality. The project document¹ confirmed this objective could be achieved through:

- (a) assessing measures, including efficient pricing of inputs and urban transport services, that would reduce GHG emissions from vehicular traffic;
- (b) identifying a schedule of measures to achieve a target air quality improvement;
- (c) quantifying the costs of various interventions to reduce GHG and local air pollutant emissions from urban transport in a setting characterized by proven technologies that are typical for non-industrialized and newly industrialized countries; and
- (d) assisting the Recipient of the Grant, i.e. the Municipality of Tehran through the Government of the Islamic Republic of Iran (GOIRI), in defining urban transport policies which are environmentally sustainable from a local and from a global standpoint.

3. Those objectives proved realistic in view of the Recipient's responsibilities. The thrust of the project was a study commissioned to assist the Municipality of Tehran in preparing an Action Plan to reduce transport related emissions in the City: 57 percent of the Grant was

¹ Memorandum and recommendation of the Director Middle East and North Africa Country Department I to the Regional Vice-President, October 1993

disbursed towards that end. Another major element was the procurement of air pollution monitoring equipment. This equipment was installed, and is maintained, by the Recipient: 29 percent of the Grant was disbursed for that purpose. The remaining 14 percent was used to reimburse fees and expenses to the members of an International Panel of Experts (IPE) convened to assist the Recipient in its tasks, especially to prepare the terms of reference for the above study and to review the Consultants' reports.

B. Achievement of Objectives

4. Physical objectives. By and large the objectives of the project have been met through the following actions by AQCC:

- (a) commissioning of a comprehensive study to assess measures that would reduce GHG emissions from vehicular traffic and that included: (i) emissions inventory; (ii) recommendations on traffic management and traffic restraint; (iii) recommendations to improve vehicle fleet and fuel; and (iv) preparation of a strategic urban transport emissions reduction plan;
- (b) preparing an Action Plan which describes a number of measures to be taken by AQCC to improve air quality in Tehran , and reduce PM-10 and GHG;
- (c) implementing that part of the Action Plan under its control, by introducing transport measures that could reduce both PM-10 and GHG by 38 percent by the year 2015; and
- (d) "recommending a set of cost effective measures to reduce transport emissions in the short (0-5 years), medium (5-10 years) and long term (10-20 years), and providing assistance in drafting appropriate regulations, and establishing certification and enforcement mechanisms for emissions regulation, including transferring this know-how to Iranian professionals and technicians²".

5. National Vs Local Objectives. The strategy to reduce GHG requires the full commitment of the GOIRI, which is not prepared at this time to introduce policy changes that would have a major impact on the reduction of GHG, namely the increase in fuel prices and the establishment of stringent regulations concerning the amount of lead in gasoline and the sulfur content of diesel. Also, during the course of the project, it became evident that the Recipient was more concerned with local pollutants, especially particulate matter (PM-10), which are a real problem in Tehran, than with the reduction of GHG, which was the prime concern of the Global Environment Facility (GEF). This led to greater emphasis having been given in the International Joint Venture's (IJV) final report to local pollutants than was envisaged at appraisal and in the Project Document, which primarily addressed GEF concerns on GHG.

6. Institutional Development. The project provided the Municipality of Tehran with a blueprint to define environmentally sustainable transport policies and to enforce those policies. AQCC was actively involved in all phases of the study referred to above, thus gaining an invaluable insight in the current methods and costs of abating pollution in an urban environment.

² Refer to Part III: Project Implementation Assessment from the Recipient's Perspective.

Other municipal agencies³ that participated in the project also benefited from working in close collaboration with the IJV.

7. The IPE provided an important contribution to the project, by preparing the terms of reference for the study and by offering comments on the various papers and reports prepared by the IJV during the course of their work. The terms of reference reflected the various background of the IPE members, and closer attention should have been paid by AQCC to the need for integrating the various concerns of the IPE members into a unified document.

C. Major Factors Affecting the Project

8. Implementation Delays. There were four major sources of delay that occurred at the very beginning of the project, and at its completion:

- (a) The Project Agreement called for terms of references (TOR) for three of the four studies to be prepared no later than four months after effectiveness of the Grant Agreement, and for the consultants to undertake their work no later than seven months after effectiveness. This very tight schedule proved impossible to follow. TORs were not issued before ten months after date of effectiveness, a delay of six months, because no proper account had been taken of the inherent delays in communication between the IPE members themselves, and between the IPE and the Recipient, especially after it was decided to issue only one set of TOR rather than four. The IJV mobilized their staff in Tehran on October 28, 1995, close to 22 months after effectiveness.
- (b) A period of three months only had been allowed for issuing the TORs, receiving and analyzing proposals from the short listed consultants, and signing a contract with the chosen consultants. This period proved much too short, and a more sensible delay of six to eight months should have been planned, in view of the inherent complexity of the international bidding procedure for a major study and of the inexperience of the project management unit in international competitive bidding.
- (c) An additional delay of five months was incurred between the signing of the contract and the actual beginning of the work, because the contract as it was signed had not received a no objection from the Bank, and contained clauses that had to be changed to become acceptable to the Bank.
- (d) Additional delays were incurred at the end of the project, when it became clear that the IJV had to make corrections to their final report, but the final meeting between AQCC, the IJV, the IPE members and the Bank, where the IJV was to present its final report, was postponed, at the request of the Recipient, by two months, due to intervening presidential elections in Iran.

³ Namely the Center for Studies and Planning, the Tehran Comprehensive Transportation and Traffic Studies Company (TCTTS), the Tehran Transportation and Traffic Organization, and the Tehran Traffic Control Company

9. The delays in implementing the project explain why the Grant Agreement was amended twice at the request of the Recipient:

- (a) The closing date was extended from December 31, 1996 to June 30, 1997, to compensate for administrative delays in issuing the terms of reference for the study on traffic and pollution, and in signing the contract for that study.
- (b) The closing date was further extended to December 31, 1997, to provide sufficient time for AQCC to review the final report, and process invoices.

10. Project Management. In large part, the success of the project can be attributed to the quality of the management team put in place by AQCC to supervise all phases of the project. In particular, (i) AQCC staff has demonstrated its capability to collect and analyze pollution data, and to use a pollution dispersion model to develop the most cost-effective measures to abate pollution; (ii) its project manager was a highly qualified specialist in air pollution control, and its staff was competent and highly motivated; and (iii) it had access to all data gathered by other municipal agencies, which proved absolutely essential in the study where a huge amount of data was processed to model the various pollutants as they dispersed in the atmosphere.

11. Disbursements. Special procedures were put in place to transfer payments to the IJV and to the IPE members. The intervening devaluation of the Iranian Rial had no effect on the project, since counterpart funds were made available for the equivalent of US\$ 2.1 million, as stipulated in the Grant Agreement.

D. Project Sustainability

12. The project is deemed **sustainable**. In particular, AQCC staff has demonstrated its capability to collect and analyze pollution data, and to promote pollution abatement actions among the various municipal agencies. Various actions taken by AQCC demonstrate its eagerness to improve air quality in Tehran, for instance: (i) AQCC has purchased a license to use the software developed by the IJV to model pollution dispersion in Tehran; (ii) it has organized national and international seminars to disseminate the results of the Consultants' reports, and its own findings; and (iii) it leads a major campaign - television, newspapers, billboards - to increase public awareness of the negative impacts of transport related pollution in the city of Tehran.

13. On the other hand, however competent and dedicated its staff, AQCC is but one of numerous subsidiaries operating under the deputy mayor of Tehran for Transport and Planning, and the present organization is highly dependent upon the local and national political situation. These various organizations are often in conflict one against the other, and links and cooperation between them are very weak, when they exist at all. To compound the problem, the Department of the Environment has not shown much interest nor commitment to the project, and it is doubtful that it would press the municipality to keep its current focus on abating pollution should there be a change of municipal government.

14. Another factor strongly affecting the outcome of the project is the reluctance of GOIRI to increase gasoline and diesel prices in order to improve fuel quality and efficiency, and to

promote urban transit. The present policy of keeping those prices very low⁴ prevents commercialization of unleaded gasoline and low-sulfur diesel, gives no incentive to vehicle owners to reduce their fuel consumption, and introduces distortions in the choice of a mode for any journey, and particularly the work journeys. The Government acknowledges such distortions, but even small annual increases that did not compensate for the inflation have created major social disturbances in the City of Tehran in the past few years. At the present rate, it will take more than ten years to attain border prices.

15. The pollution measuring equipment that was purchased and installed as part of the project is of US origin. In view of the current embargo that prevents US firms and their foreign subsidiaries to sell goods and services to GOIRI or to Iranian firms, AQCC cannot obtain spare parts to maintain this equipment in a proper condition. This is viewed as a problem by AQCC, but it should not affect the project sustainability, which is based mainly on the implementation of the Action Plan, and not on further collection of pollution data.

E. Bank Performance

16. Identification. One can say without doubt that the Bank performance in identifying the project has been **highly satisfactory**. The TERP project was one of the first projects that were approved by the GEF board after it was established following the United Nations Conference on Environment and Development in Rio de Janeiro (1992). The first Bank mission was held in January 1992, and the project was appraised in May of the following year. The Municipality of Tehran was selected for the following reasons: (i) it was, and still is, a highly polluted city with considerable potential for low cost interventions that would reduce both GHG emissions and local air pollutants; (ii) it had a rich diversity of transport related developments either planned or under implementation; and (iii) the GOIRI was strongly committed to address global climate change issues. Also it became evident during the course of the study that the various municipal agencies had acquired over the years a large data bank on vehicle ownership and categories, traffic flows, travel patterns (through origin-destination surveys) and air pollution measures. This basic information was not necessarily available in other large cities.

17. Appraisal. The Bank performance in appraising the project was **satisfactory**. The appraisal mission was highly concerned with the disorganized urban transport system in Tehran, with good reasons, and it recommended that the project be carried out under the responsibility of the Department of Transportation and Traffic of the municipality of Tehran through three different agencies, namely AQCC, TCTTS, and the Tehran Vehicles Technical Inspection Bureau. This arrangement proved too cumbersome, and AQCC had the sole responsibility for the project after it was made effective.

18. The appraisal mission had properly identified the key issues that the project should address, but more care should have been given to the identification of the various components of the study, given the limited scope of this pilot project. The study should have focused on emissions inventory, vehicle fleet and fuel improvements, and on strategic urban transport emissions reduction planning. As it were, the study was burdened with analyses of various types

⁴ Current gasoline prices in Tehran are less than US\$ 0.05 per liter, and less than US\$ 0.02 per liter for diesel, as compared to the current border price of about US\$ 0.11 per liter.

of land uses, traffic restraint schemes⁵, and modal shift models that had little immediate impact on the pollution levels in Tehran.

19. Another oversight of the appraisal mission concerned the unfamiliarity of these organizations with standard Bank's procedures, from procurement to disbursements to auditing of the project accounts. This proved a major handicap in the course of the project, and was a major cause of delay, although procedures as such were never questioned.

20. Supervision. Bank supervision is rated as **satisfactory**. The Bank conducted eight missions at various stages of the project, and was able to assess its progress and the contribution of the Recipient, particularly (i) the collection and analysis of pollution data; (ii) the construction of small buildings to house the pollution monitoring equipment acquired through the Grant; and (iii) technical and administrative support to the IJV. Numerous communications between the Bank and AQCC have contributed to local institutional development and to the excellent relationship which continued through project closure.

21. Throughout the project, the Bank helped the Recipient in its relations with the IJV and with the IPE, providing comments on all documents that were made available and helping AQCC in properly assessing problems and drawing lessons for the future. Besides this technical assistance, the high level of collaboration between the Bank and the Recipient ensured that the project had been substantially completed by the closing date (December 31, 1997) and that the Grant will most probably be entirely disbursed⁶ by the end of April 1998.

22. During meetings in the offices of the IJV, the Bank obtained direct information on the three partners engaged in the joint venture: a large international consulting firm, a motor vehicle test center, and a research institute with an active research program on airborne pollution dispersion models. Those meetings provided the Recipient with the occasion to discuss detailed technical matters with the experts and the technicians who were actually involved in the study and who made tests on Iranian engines and fuels in particular.

F. Recipient Performance

23. Preparation. The Recipient performance in preparing the project can be rated as **satisfactory**. The Project Agreement between the Bank and the Municipality of Tehran was certainly the most important decision made during project preparation, and it was one of the major factors in the overall success of the project. On the other hand, the Municipality did not foresee the technical, not to mention administrative, problems in having three different agencies each in charge of a portion of a relatively small project. This was fortunately corrected at the project inception, when AQCC was designated as the sole agency responsible for the project and when it was decided to invite proposals for a single comprehensive study, instead of four separate studies.

24. Project Management. Project management was **highly satisfactory**, with AQCC's competent project director having exercised true leadership from the beginning. All procurement

⁵ There was already a successful traffic restraint scheme, first introduced in 1979, and considerably enlarged since then.

⁶ As of January 23, 1998, the undisbursed amount was US\$ 7,768.00.

for goods and services were made according to Bank's procedures: AQCC's unfamiliarity with those procedures, including procurement and disbursement procedures, led to some delays in approving contracts and invoices, but corrections were rapidly made. The Ministry of Economic Affairs and Finance was responsible for administering the Special Account, and counterpart funds were made available when needed.

25. Audit Reports. This covenant was complied with minor delay. Independent auditors were appointed by AQCC, and they submitted two reports: (i) the first report was limited to transactions in the Special Account up to November 30, 1995; and (ii) the second report, dated August 30, 1997, covered the transactions in the Special Account from December 1, 1995 to November 30, 1996, as well as all transactions since the inception of the project in WBTF Account 28642 GET-IRAN. The Auditors stated in their latest report that "the expenditure is fairly stated in accordance with Schedule 1 of Global Environment Trust Fund Grant Agreement".

26. One covenant that was not met was the establishment of a Project Advisory Group (PAG) consisting of representatives from various ministries⁷ and from the United Nations Development Program (UNDP) resident mission in Iran. Rather AQCC received ad hoc advice from two university professors in Tehran who were called upon to express their opinions whenever it was deemed necessary.

G. Assessment of Project Outcome

27. The project is rated as **satisfactory**. It has achieved most of its objectives, and is expected to contribute to strengthening AQCC as the agency responsible for monitoring and improving air quality in Tehran. The equipment purchased through the Grant is working properly, although the current US embargo on trade with Iran makes it doubtful that it can function over the long run without appropriate spare parts. The draft final report submitted by the IJV was deemed inadequate for numerous reasons, and the final report, although it incorporated some revisions to correct gross mistakes, did not take proper account of most of the comments that were made either by AQCC, the IPE members or the Bank. For this reason the project could not be rated highly satisfactory.

H. Future Operation

28. In the wake of the Air Pollution Conference held in Tehran in June 1997, AQCC has prepared an Operation Plan based on the Action Plan recommended by the IJV. This Operation Plan can be summarized as follows:

- (a) Operate Ambient Air Monitoring stations to collect additional data for analysis.
- (b) Expand the number of stations through acquisition of additional equipment.
- (c) Promote public awareness through various media campaigns.

⁷ Representatives from the ministries of Foreign Affairs, Oil, Industry, Economics and Financial Affairs, Housing and Urban Development, Plan and Budget Organization, and Health were to have participated in the PAG.

- (d) Implement the proposed measures in the TERP study, focusing firstly on the Ministry of Roads and Transport, and subsequently on the other ministries, namely Interior, Oil, and Health and Medical Education.
- (e) Update the emissions database using AQCC's air pollution dispersion software to validate the simulations with a higher degree of reliability.
- (f) Update proposed development action strategy as indicated in the TERP study.

I. Key Lessons Learned

29. Strong commitment to reduce GHG is needed at the national level. The reluctance of the GOIRI to increase gasoline and diesel prices means that a large number of recommendations to lower GHG emissions from vehicles will not be implemented. GHG reduction is a long term effort and it requires a long term commitment from all stakeholders, and particularly by the central government.

30. The implementation of the Action Plan based on the recommendations of the TERP study will also require a strong commitment from the part of the Municipality, and a level of collaboration between the different municipal agencies that has not always existed in the past. Finally the municipality's first priority to reduce PM-10 may not agree with the Government's objective to reduce GHG.

31. Any modeling effort requires a large amount of data. In the TERP case, there was a need to model both the traffic patterns in the City, and the air pollution dispersion patterns. This data, in the proper format, may not be available in every city. If available it would be disseminated between various agencies that may have different priorities from the reduction of GHG or PM-10.

PART II : STATISTICAL TABLES

Table 1 : Summary of Assessments

A. Achievement of objectives	Substantial	Partial	Negligible	Not applicable
Macro policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sector policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Financial objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Institutional development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical objectives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poverty reduction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gender issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other social objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Environmental objectives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public sector management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private Sector development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

B. Project sustainability	Likely	Unlikely	Uncertain
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. Bank performance	Highly satisfactory	Satisfactory	Deficient
Identification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparation assistance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Appraisal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Supervision	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

D. Borrower performance	Highly satisfactory	Satisfactory	Deficient
Preparation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Implementation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Covenant compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E. Assessment of outcome	Highly satisfactory	Satisfactory	Unsatisfactory	Highly unsatisfactory
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 2 : Related Bank Loans/Credits

Loans/Credits & Title	Purpose	Year of Approval	Status
Loan 3583 - Power Sector Efficiency Improvement Project	To have a relatively short gestation period so as to address the load shedding problem; to upgrade planning capabilities to help ensure the sustainability of project benefits; to lay the groundwork for commercialization and to set the stage for attracting private sector participation.	1993	Ongoing.
TF028215 - Rational use of energy	To finance the preparation of the institutional and regulatory policy aspects of energy efficiency; to follow-up on existing demonstration audit programs; to advise on a national energy conservation awareness program; to strengthen training of selected staff in energy conservation and auditing in the relevant ministries and municipalities as well as to hold a workshop in Tehran.	1996	Ongoing.

Table 3 : Project Timetable

Steps in project cycle	Date planned	Date actual/latest estimate
Identification (EPS)	January 6, 1992	January 6, 1992
Preparation		
Appraisal	May 1, 1993	May 1, 1993
Negotiations	August 31, 1993	August/September, 1993
GE Board Presentation	--	October 5, 1993
Signing	--	October 5, 1993
Effectiveness	October 30, 1993	January 3, 1994
Midterm review		
Project completion	April 30, 1996	June 30, 1997
Loan closing	December 31, 1996	December 31, 1997

Table 4 : Loan Disbursements - Cumulative Estimated and Actual (in US\$ millions)

Fiscal Year	FY94	FY95	FY96	FY97	FY98
Appraisal estimate	800	1800	2000	2000	2000
Actual	567	567	899	1543	2100
Actual as % of Estimate	71	32	45	77	105
Date of disbursement					

Note: At appraisal the Grant was estimated at US\$ 2.0 million (equivalent of SR 1.5 million), while its present value is US\$ 2.1 million

Table 5 : Key Indicators for Project Implementation

Key implementation indicators in SAR	Estimated	Actual
a) Constitution of an International Panel of Experts	4 experts	4 experts
b) Procurement of Air Pollution Monitoring Equipment	no equipment specified	detailed list of equipment in project files
c) Studies	4 studies (see details in table 6)	1 comprehensive study

Table 6 : Studies included in the project

Study and Purpose	Status	Impact
1. Emissions Inventory and Air Quality Monitoring	These four studies were replaced by one comprehensive study that included the same objectives and technical content	The study was the basis for the Action Plan being implemented by AQCC and the Municipality of Tehran
2. Traffic Management and Traffic Restraint Studies		
3. Vehicle Fleet and Fuel Improvement Studies		
4. Strategic Urban Transport Emissions Reduction Planning		

Table 7A : Project Costs

Items	Appraisal estimate (US\$ million)			Actual/Latest estimate (US\$ million)		
	Local costs	Foreign costs	Total	Local costs	Foreign costs	Total
Equipment	0.30	0.30	0.60	0.60	0.60	1.20
Studies	1.70	1.45	3.15	1.50	1.20	2.70
IPE	-	0.25	0.25	-	0.30	0.30
Total costs	2.00	2.00	4.00	2.10	2.10	4.20

Note: See note to Table 4

Table 7B : Project Financing

Source	Appraisal estimate (US\$ million)			Actual/Latest estimate (US\$ million)		
	Local costs	Foreign costs	Total	Local costs	Foreign costs	Total
GEF	-	2.0	2.0	-	2.10	2.10
Domestic contribution	2.0	-	2.0	2.10	-	2.10
Total costs	2.0	2.0	4.0	2.10	2.10	4.20

Note: See note to Table 4

Table 8 : Status of legal covenants

Loan reference	Covenant type	Present status	Fulfillment Date	Description	Comments
<u>Grant Agreement</u>					
2.02(b)	1	C		Special Account	
3.01(a)	5	NC		Project Advisory Group	The Recipient obtained advice from two University professors
3.01(b)	5	C		Subsidiary Agreement with the Municipality of Tehran	
4.01(b)	1	CD		Audit Reports	Audit reports were prepared for the Project Management Unit (See Project Agreement covenants)
<u>Project Agreement</u>					
3.01(a)	1	CD		Audit Reports by Independent Auditors	

Note: Type 1 Financial Covenants
Type 5 Other Covenants
C Complied with
NC Not complied with
CD Complied with delay

Table 9 : Bank Resources : Staff Input

Stage of Project Cycle	Estimated weeks	Actual weeks	Estimated US \$	Actual \$
Through Appraisal	NA	11.6	NA	33.0
Appraisal - Board	NA	9.8	NA	44.6
Board Effectiveness	NA	-	NA	-
Supervision	NA	48.6	NA	152.5
Completion	NA	8.8	NA	27.6
Total	NA	78.8	NA	257.7

Table 10 : Bank Resources : Missions

Stage of Project Cycle	Fiscal Year	No. of persons	Staff-weeks in Field	Specialized Staff Skills Represented
Through Appraisal	Nov. 16 - 25, 1992	1	1	Transport Specialist
Appraisal through Board Approval	May 1 - 8, 1993	2	2	Principal Transport Economist, Environmental Specialist
Supervision	April 18 - 27, 1994	2	3	Principal Transport Economist, Environmental Specialist
	Jan. 5 - 12, 1995	2	2	Principal Transport Economist, Transport Specialist
	Jan. 6 -10, 1996	2	2	Principal Transport Economist, Transport Specialist
	Nov. 3 -10, 1996	1	1	Transport Specialist
	March 14 - 17, 1997	1	1	Transport Specialist
Completion/Closing	Jun. 27 - Jul. 2, 1997	2	2	Principal Transport Economist, Transport Specialist

PART III: PROJECT IMPLEMENTATION ASSESSMENT FROM THE RECIPIENT'S PERSPECTIVE

1- Background:

The life threatening atmospheric pollution, arising from the rapid urbanization during the last few decades, has for long been a matter of discussion by the government, authorities, experts and the people. However no unified Strategy for reducing air pollution in Tehran had been identified yet.

Despite of significance and various dimensions of the air pollution in Tehran, only a few aspects have ever been considered, as the investigations show, no comprehensive report has been made.

Considering the aforementioned issues and since the air pollution from transportational emissions in Tehran is turning in to a serious predicament with similarities to a number of mega cities within the globe, Tehran was selected by Global Environmental Facilities(GEF) as the appropriate location for the project to be initiated. Tehran municipality due to its high scientific and executive abilities, with co-funding from the GEF for international technical assistance, started a broad study on Tehran transport emissions reduction. This unique project is an integrated study for air pollution and abatement strategies from transport sector based on research, survey and analysis including socio-economic impacts within the Greater Tehran Area(GTA).

Following the exchange of GEF grant agreement, experts team of GEF paid a visit to Tehran in 1992 in order to collect available information on transportation, vehicle fleet, fuel and the plans. The final grant document was concluded between the Ministry of Economics and Financial Affairs(as the representative of IR of Iran) and the World Bank(as the implementing agency for GEF fund).

The Municipality of Tehran was assigned as the implementing body for the whole study together with the international technical assistance.

2- Structure of the Project

Coming to agreement, to enjoy the global experiments, an expert team as the International Panel of Experts were dispatched to Iran. They exchanged views and had a series of discussions with the relevant organisations involved in traffic and

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transportation, fuel, vehicles health, population, environment and urban planing, to collect the necessary data and information concerning the study.

To conduct the project, some of the local and international companies were invited to tender for the fields of:

- a) urban palaning and transportation
- b) Fuels and vehicles fleet
- c) Metrological affaisr and Modelling

In 1994, in response to the request 16 international companies expressed their willingness for carrying out the project. In the first phase, their capabilities were investigated which caused the number to decrease to 8 Companies.

Among them swedish joint venture accepted the lowest tender. The group was comprised of SWECO as the project management(for urban. planing and transportation), MTC, the Swedish Motortestcentre (for fuel, engine and pollution emitted from vehicles and SMHI, the Swedish Metrological and Hydrological Insitute (Metrological Affairs, air Pollution Modelling).

The study was initiated by the Municipality of Tehran(MOT) with the cooperation of Air Quality Control Co.(AQCC)(affiliated to MOT) concerning the technical affairs.

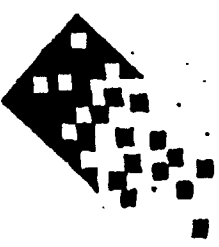
The World Bank and the Ministry of Economics and financial Affairs, financialty supervised the contract. An International Panel of Experts composed of 4 university professors from American and European Countries were also appointed to supervise the study along with the cooperation of AQCC.

Another group comprised of the representatives of the local organisations and ministries were assigned as the project consultants.

The major organisations acted as the Project Advisory Group for the project were as follows:

Ministry of oil, Ministry of Industry, Ministry of Economics and Financial affairs, Ministry of Health, Ministry of Housing and Urban development, Iran Metrological Organisation, Department of Environment, Iran Civil Aviation Organisation and the Municipality affiliated organisations as Tehran Transportation and Traffic Organisation, Tehran Traffic Control Co., Tehran Comprehensive Transportation and Traffic Studies Co, and Tehran Vehicle Technical Inspection Bureau.

Meanwhile, since carrying out the project was to some extent related to United



Nations, the Tehran office for the United Nations Development Programmes was responsible to arrange the meetings among the consultants and the Ministry of Foreign Affairs.

GEF as the fund supporter of the project, spent gratuitously \$2 million for purchasing 3 sets of Monitoring stations and providing the expert fees. MOT also spent some \$2 million from the local credit but the financial supervision was carried out by the Ministry of Economics and Financial affairs.

3- Project Objectives

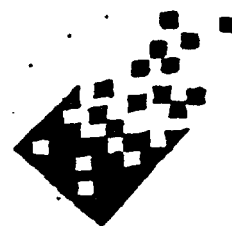
The objectives of the project were to assist the MOT to develop an Action Plan for reducing transport emissions.

1. Evaluating the air pollution and development of appropriate dispersion models for predicting air quality levels under various scenarios.
2. Vehicle evaluation due to the emissions, recommending appropriate standards, tests, and technical assessment for each class of motor vehicle.
3. Fuel Evaluation due to the existing kinds of fuel, use of alternative fuels and dual fuels.
4. Traffic management through recommendations, to upgrade the traffic signal system with new, modern traffic signal controllers, using high capacity buses, carrying out intermodel shift, and urban planning, lands use and transportation demands management.
5. Regulations due to pricing the vehicles and the fuels, and taking other measures for observing both national and international communities.

The project is defined in the terms of reference and the main parts of the work are as follows:

- I. Problem identification/definition.
- II. Assessment of current emissions control strategies.
- III. Project of future problems under currently planned control.
- IV. Identification of alternative strategies for emissions control.
- V. Development of an evaluation framework.
- VI. Development of institutional arrangements.
- VII. Draft final Report and holding Air Pollution Conference.
- VIII. Finalising the advance plans.

4- Project Findings



Projection of future air quality in Tehran, and emissions of greenhouse gases (GHG) through consideration of the most effective methods, an appropriate time for implementation, Economic and financial assessment and the level of effectiveness on any measure for improving the air quality are the major results of the project.

Carrying out the Action plan, the following items were taken in to consideration:

1. Evaluation the vehicle emission in Tehran, and the condition of GHG at the present and in the future through analysing the data related to vehicle emissions.
2. Establishment of monitoring station systems for collecting data and improving the appropriate models for dispersion to predict the air quality under different scenarios.
3. Evaluating the feasibility, costs and effectiveness of other measures such as fuel pricing, traffic planning, transport pricing, lands use, transportation demands management, and use of alternative fuels.
4. Reviewing existing and proposed standards and policies to control vehicle emissions and fuels, recommending appropriate standards, tests to consider current air pollution levels, future increases, and the timing of emission reductions needed for a phased programme of air quality improvement.
5. Recommending a set of cost effective measures to reduce transport emissions in the short (0-5 years), medium (5-10 years) and long term (10-20 years) and providing assistance in drafting appropriate regulations, and establishing certification and enforcement mechanisms for emissions regulation, including transferring this know-how to Iranian professionals and technicians.

5- Incurred Delays

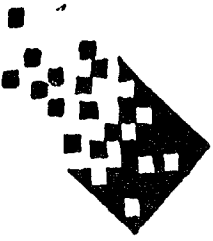
The main reasons for the incurred delays during the project implementation may be categorized as follows;

I. The non conformity between the services and the budget:

since terms of reference of the project was prepared in 3 months time, and there was a shortage of time for studying the information existed or lacked, the perfect implementation of the terms of reference required a lot of time.

II. Facing a lot of problems in arranging the simultaneous presence of the IPE members:

Since the supervisors of the project were comprised of university professors from the USA and Greece, arrangement of the simultaneous meetings in Iran were impossible because of the interrelations occurred in their plans. So having their views



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on the process of the project was a problem.

III. Lack of enough information and statistics in the some fields of the project:

Providing the essential information on different phases of the project cause a lot of time to be spent which was not predicted in TOR, for instance, in the field of the base study on transportation and traffic, preparing the basic data and installing the computer software EmmE/2 (software used for traffic alnalysis) consumed a lot of unpredicted time.

IV. The JV delay in presenting an on time report:

According to the agreement made between the manager of the project and the contractor, the manager presented its view points to the contractor in written but the delay occurred in presenting the periodical reports by the contractor to the manager was another main reason for the delay.

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TEHRAN TRANSPORT EMISSIONS REDUCTION PROJECT

