

Environment



Iran is currently burdened with numerous environmental concerns including air pollution, water and soil contamination, the destruction and over-exploitation of natural resources, and a four-year drought that has added to the country's desertification. Except for the water shortage, which little can be done about, these problems have been to some degree avoidable and could essentially be blamed on weak governmental organization, industrial mismanagement, the explosive population growth and subsequent urbanization, as well as the devastation brought on by eight years of war with Iraq. Due to increasing public pressure, the government has in recent years begun to tackle these problems – albeit gradually and often ineffectively – and most ministries have now either set up environmental departments or are in the process of doing so.

Overview

Although the history of environmental protection activities barely exceeds three decades, there has been no shortage of laws and regulations put into effect in this period. These measures were essentially initiated with the establishment of the Hunting and Fishing Organization in 1967, which was renamed the Environmental Protection Organization (EPO) in 1972. The structure of this organization altered in 1974 and its power and responsibilities grew as it became affiliated to the Prime Minister's Office and was administered by the High Council of Environmental Protection (HCEP). This council is now connected to the President's Office and is chaired by a specially appointed vice-president, Dr. Massoumeh Ebtekar, while its secretary is the EPO Director. The council members are appointed to a three-year term and consist of the Ministers of Agricultural Jihad, Interior, Industries, Housing and Urban Development, and Health and Medical Education, as well as the Head of the State Management and Programming Organization, and four other qualified individuals nominated by the EPO.

The organization has performed extensive activities to reduce pollution levels, and has envisioned several laws and regulations through the Second and Third Five-Year Development Plans. The greenhouse effect is one of the environmental problems of particular significance, both regionally and globally, and Iran is taking preventive measures through membership in the related international protocols and conventions.

Other environmental issues focus on the Caspian Sea, Persian Gulf and the Sea of Oman, along which Iran has extensive coastlines. The regulations defining the environmental protection in these areas are in the form of international agreements, specifically with the littoral states. Iran's industries situated on the Caspian and Persian Gulf, particularly those in the oil and energy sectors, have been responsible for a significant number of ecological problems. Fishing ports in these areas fall under the jurisdiction of the Iranian Fisheries Joint Stock Company, which manages, develops and protects the related industries. The responsibilities of this organization, however, do not negate the duties of the EPO.

State environmental offices are established in the government ministries involved with sectors that could affect the environment, such as the Ministries of Petroleum, Interior, Industries, Housing and Urban Development, and Health. These departments work alongside the EPO and related institutes, in order to address concerns, undertake joint projects and try to solve the country's environmental problems.

In addition to the state-run organizations, several non-governmental organizations (NGOs) began environmental activities in 1980, but their measures were limited due to the Iran-Iraq war. NGOs have been more active since 1990, and their most significant achievements have been in education, research and practical initiatives.

Air Pollution

This is the most serious of Iran's environmental problems, especially in Tehran due to the emissions from vehicle exhausts. Research conducted in 1997 by the Tehran Municipality involved the cooperation of two international organizations: the World Bank (providing \$2 million in aid) and Japan's International Cooperation Agency (supported by UNICO and the Japan Meteorological Association). The project provided an exact

picture of the pollutant sources and their levels of responsibility for Tehran's notoriously poor air quality. A comprehensive plan to reduce pollution in Tehran was prepared using the data and results of the studies, and the EPO has begun programming and executing measures to control pollution levels.

The plan to reduce air pollution has recently been extended to six other major cities around the country – Mashad, Tabriz, Ahwaz, Arak, Shiraz and Esfahan – and ultimately aims to attain the standards set by the World Health Organization.

The table below shows the process of changes in density of pollutants in Tehran between 1996 and 2001. The densities of NO₂ and SO₂ in 1996 were below the standard limit determined by EPA, but reached twice that ceiling in 2000, owing to a lack of preventive programs. The index of air pollution (PSI) was reported as 'unhealthy' for 252 days during 1999 and 282 days in 2000. The condition is still unacceptable.

Table 1- The Process of Annual Change in Density of Tehran Air Pollutants

Pollutant	1996	1997	1998	1999	2000	2001
CO (PPM)	9.83	9.06	9.42	9.06	14.1	14.3
NO ₂ (PPB)	34.92	47.03	38.1	47.03	102.63	82.62
SO ₂ (PPB)	29.5	52.85	87.67	52.85	64.29	97.67
PM-10 Mg/m ³	107.95	98.19	109.4	98.19	100.7	110.3

According to the statistics recently released by the Automobile Technical Tests Center, over 1,200,000 vehicles in Tehran are more than 20 years old and lack catalytic converters that filter auto exhaust. The situation is worsened by the widespread use of low-quality, leaded gasoline. The city's geographic position is another factor in the high pollution levels as the Alborz Mountains to the north effectively trap the pollutants over Tehran, and the region's elevation (approximately 1500m) makes fuel combustion inefficient, further adding to the problem.

Since 40% of the cars in Iran are at least two decades old – a figure that only a few other countries can likely match – the government has set an objective not only to produce more cars to meet the ever-growing demand, but also to produce enough new cars to replace the old ones. The following table shows the age dispersal of Iran's automotive fleet:

Table 2 - Age Dispersion of Cars in Iran, December 2000

Age (Years)	Market Share (%)
0-5	32.9%
6-10	10.9%
11-15	3.2%
16-20	10.6%
>20	42.4%

Source: Ministry of Industries and Mines

Authorities have recently initiated a program whereby older cars, responsible for most of the urban pollution, are collected. The owners of these vehicles are compensated and provided with low-interest loans to buy replacement automobiles.

The most significant stationary sources of air pollution in Tehran are industries and households, although parking lots, dry cleaners and leakage also make up a small proportion of the effluence. Table 1 shows the share of pollution sources and types of emissions contributing to the air pollution in Tehran.

Table 3 - Shares of Emissions of Pollution Sources in 1997

Source	CO	NO ₂	SO ₂	PM-10	NMVOG
Mobile	96.8%	62%	15.54%	79.45%	25%
Stationary	3.2%	38%	84.1%	20.52%	75%

In addition to these pollutants, some 10 million tons of greenhouse gases are emitted every year, mainly due to the CO₂ produced by vehicles in Tehran. However the amount of this gas produced by cars is less than the expected level, due to the incomplete combustion of fossil fuels, as well as the fact that catalytic converters are not used.

Energy Consumption

Studies conducted on population and energy consumption during the last two decades indicate that the amount of energy produced in 1979 was the equivalent of 6.98 barrels of crude oil per capita, and had increased to 8.85 and 13.5 barrels by 1989 and 1999, respectively. The respective energy consumption per capita was 5.74, 7.04 and 10.29 barrels in those years.

These figures indicate a 5.1% increase in the amount of energy and a 5% growth in final consumption during this period. The table below details the proportions of various energy sources in the total consumption during the 20-year period.

Table 4 - Share of Sources of Energy Consumption

Description	1979/80	1984/85	1989/90	1994/95	1999/00
Oil Products					
Household/Commercial	28.25%	23.81%	23.50%	21.08%	15.55%
Industry	17.60%	18.95%	17.68%	10.16%	7.63%
Transportation	26.94%	24.60%	24.48%	26.09%	26.39%
Agriculture	5.72%	6.49%	7.17%	5.20%	3.96%
Others	4.33%	7.72%	2.23%	4.48%	5.58%
Total	82.84%	81.21%	76.05%	67.02%	59.10%
Natural gas					
Household/Commercial	1.52%	6.27%	4.56%	11.18%	15.91%
Industry	0.64%	3.50%	7.66%	10.19%	12.11%
Others	4.88%	0.06%	2.42%	2.27%	2.81%
Total	7.04%	9.84%	14.64%	23.65%	30.83%
Solid Fuels					
Household/Commercial	1.61%	1.10%	0.87%	0.61%	0.44%
Industry	3.45%	2.05%	1.28%	1.31%	1.43%
Total	5.07%	3.15%	2.15%	1.92%	1.87%
Electricity					
Household/Commercial	2.58%	3.37%	4.35%	3.92%	4.27%
Industry	2.35%	2.08%	2.04%	2.74%	2.80%
Agriculture	0.14%	0.35%	0.54%	0.56%	0.74%
Others	---	---	0.24%	0.19%	0.39%
Total	5.07%	5.80%	7.17%	7.41%	8.20%

The total amount of energy available in 1999 was the equivalent of 1.631 billion barrels of crude oil, 98% of which was produced domestically. Furthermore, 49% of this, approximately 816.6 million barrels of crude oil, was consumed in the country. The combustion of these fossil fuels emitted more than 238.5 million tons of CO₂, the sources of which are presented in Table 5.

Table 5 - CO₂ Emissions in 1999 (million tons)

Sector	Household	Commercial & Public	Industry	Agriculture	Transportation	Power Plants
Emissions	56.050	14.2548	55.7634	10.8366	35.8467	65.882

Environmental Laws

In recent years, the EPO has undertaken more activities in establishing standards and criteria for environmental pollutants and as such, clause D of Article 104, and Article 134 of the law governing the Third 5-Year Development Plan were ratified. The by-laws aim to prevent the pollution of air, as well as underground and aboveground water sources, and specified the related penalties for violations. Therefore, production units are obliged to adapt their technical specifications with ecological standards. The units that refuse to follow the procedure, and whose operations lead to pollution and environmental destruction would be penalized proportionately.

According to the law, prior to the implementation of any large production and services, projects and plans should be environmentally assessed during their feasibility studies. These projects include the establishment of petrochemical factories and refineries with any production capacity, power plants with more than 100MW production capacity, steel industries – both mill plants and their suppliers with an annual production capacity of

more than 300,000 tons and rolling plants with over 100,000 tons per year – as well as dams and other hydro-structures.

In addition, if the projects are located near similar projects, in such a way that they might affect or be affected by them, they would be subject to environmental evaluation, regardless of their sizes and production capacities. As a result, their operations could only continue after receiving EPO approval. The project operators are required to submit a report on the environmental effects of the plan, which should be prepared by independent consultants, scientific centers and/or specialized companies whose qualifications are confirmed by related authorities. The evaluation should cover both construction and commissioning, and distinguish between the various effects of the projects' major activities.

Article 134 requires that operating licenses be approved and issued for any company looking to exploit aboveground or underground water supplies or establish urban distribution networks involving heavy industry, animal husbandry and services units. Activities producing large amounts of wastewater, including sewage treatment installations, would also require official consent, while the extension of previously issued permits would be dependant on passing an inspection. Any infractions would result in penalties, based on the type and amount of pollution.

Considering that 73% of air pollution in Tehran is produced by vehicle emissions, several projects have been, and are being, undertaken. For example, unleaded gasoline was introduced in the Iranian year 1380 (starting 21 March 2001), and diesel fuel with a minimal amount of sulfur also became available. From 21 March 2002, all gas stations will sell unleaded fuel with octane levels of 87 and 95. The main objective of the plan is to omit lead in order to accommodate the catalytic converters currently being installed in new Iranian-made cars (approximately 250,000 in 2000). Since 1999, all cars, both imported and domestic, have had to meet the ECE-ISO4 standards for emissions, and from the upcoming Iranian year manufacturers will be required to observe ECE-R83 standards.

Regarding heavy vehicles that traditionally use diesel fuel, the government has announced that all buses and minibuses manufactured since 21 March 2000 should have the capability to use gas, according to EURO1 standard. Gas fuelled buses and mini-buses (LPG and CNG) should also meet the ECE 13.04 standard.

International Agreements

Due to the vast sea borders Iran shares with countries both in the north and the south, issues like the greenhouse effect and environmental problems in offshore areas should be dealt with according to international agreements. The EPO is the national authority responsible for signing most of these agreements and the Iranian government has enacted some additional laws and regulations to protect the marine environment. The following table illustrates the names and dates of agreements signed by Iran relating to environmental protection.

Table 6 - Iran's Membership in International Protocols and Conventions

	Name	Binding Dates	Iran's Signing
1	UN Environmental Program 1351	--	1983
2	International Union for Conservation of Nature and Natural Resources – 1948	--	1974 and 1991
3	Convention on Significant International Lagoons, Especially the Habitats of Aquatic Birds – Ramsar, 1971	1975	1975
4	Accepting the Amended Law of Important International Lagoons, Especially the Habitats of Aquatic Birds – Ramsar, 1971	--	1993
5	Amended Protocol of the Convention on Significant International Lagoons, Especially the Habitats of Aquatic Birds – Ramsar, 1971	--	1985
6	Convention on Supporting the World Cultural and Natural Heritage – UNESCO, 1972	1975	1975
7	Convention on International Trade of Species of Wild Animals and Plants Facing Extinction – Washington, 1973	1975	1976
8	Convention to Cooperate on Protection of Marine and Onshore Areas Against Pollution – Kuwait, 1978	1979	1980
9	Regional Protocol to Control Pollution from Oil and Related Materials in Emergencies – Kuwait, 1978	1979	1980
10	Protocol of Marine Pollution Caused by Offshore Exploration and Exploitation – Kuwait, 1989	--	1992
11	Protocol of Supporting Marine Environment Against Onshore Polluting Sources – Kuwait, 1990	--	1993
12	Protocol of Controlling Overseas Disposal of Dangerous Waste Materials at Sea – Tehran, 1998	--	2001
13	Vienna Convention to Protect the Ozone Layer, 1985	1988	1990
14	Montreal Protocol on the Materials Diminishing the Ozone Layer, 1987	1989	1990
15	Amendment of London and Copenhagen Meetings Concerning Montreal Protocol	--	1996
16	Convention on Controlling Overseas Transfer and Disposal of Harmful Waste Materials – Bazele, 1989	1992	1993
17	UN Convention on Climatic Change – New York, 1992	1994	1996
18	Bio-diversity Convention – Rio de Janeiro, 1992	1993	1996
19	UN Convention to Control Desertification in Countries Facing Drought – Paris, 1994	1997	1994
20	Convention to Prevent Marine Pollution Resulting from Disposal of Waste Materials – London 1972	1975	1997
21	International Convention on Prevention and Confrontation of Oil Contamination – London, 1990	--	1990
22	International Convention to Intervene in International Waters in Case of Oil Spills – Brussels, 1969	1975	1996
23	International Convention to Intervene in International Waters in Case of Contamination by Non-oil Materials, 1973	1983	1997
24	International Marine Rescue Convention – London, 1989	--	1994

Research centers are authorized to conduct studies concerning marine issues, including the identification of physical and chemical properties, bio-resources, and geology in the Caspian basin and in the Persian Gulf and Sea of Oman.

Foreign organizations applying to conduct scientific research should take action through their governments or the related international authorities, and submit a copy of the report to the government of Iran.

Opportunities

The primary buyer of environmental technology in Iran is the government sector, either directly or through its affiliated private companies. For example, the Ministries of Industry and Mines, Petroleum, and the Interior are to differing degrees involved in the plan to reduce urban air pollution, and foreign suppliers should focus their efforts on the specific ministry or organization that their products or services would benefit.

The plan to reduce air pollution considers the use of LPG and CNG fuels, especially by public vehicles (taxis, buses, minibuses), as one of the most effective ways of solving the problem of smog. At present, there are a number of gas-fuelled taxis in Tehran, which are able to use both petrol and LPG. The plan would also add 200 CNG-fuelled buses to the municipal fleet. The gas-fuelled vehicles would reduce CO, SO₂ and polluting particles, however NO₂ and CH₄ emitted from exhaust pipes would increase. Nevertheless, catalytic converters may be effective in preventing this problem. There are opportunities for companies to mass-install these components, as well as provide additives to make the fuel more environmentally friendly. The plan provides opportunities not only for pollution reduction and prevention technology, but also pollutant monitoring and measuring equipment.

Although the trend towards pollution prevention is on the increase, progress is slow due to the amount of capital needed to implement projects. The funding required for the current decade by various government departments is predicted as follows:

Table 7- Capital Required for Reducing Air Pollution (US\$ million)

Department	2000	2001-2004	2005-2009
Ministry of Industries	196.063	676.463	132
Petroleum Ministry	81.4	732.6	--
Tehran Municipality	37.521	105.319	--
Total	318*	1514	132

** About \$3 million of this amount would be allocated to the EPO to supply 13 machines to control and assess air quality and the software for a simulation network to illustrate the scattering of air pollution.*

These figures only refer to the pollution reduction project in Tehran. The six others being implemented in other major cities would be smaller.

Potential for Renewable Energy Sources

At present, Iran's Fuel Consumption Optimization Organization is undertaking several projects concerning methods of optimizing energy consumption in all sectors, as well as using renewable and pollution-free sources of electricity. The organization, which receives financing as prescribed by the Third 5-Year Development Plan, provides support for independent research plans and companies who wish to establish power plants that run on alternative energy sources, including:

- Wind energy: studies show that the country's wind energy production capacity is about 6500 MW. Power plants that run on wind power are currently in operation Roudbar and Manjil, which contains a 500 KW turbine producing approximately 2 million KW/h of electricity. Similar turbines in Germany, the USA, Netherlands and Denmark produce 1.6 million KW/h.
- Solar power: The average solar energy radiation in Iran is somewhere in the region of 200W/sq.m, with the central plateau recording the highest readings. The range of sun radiation varies from 2.8 KW/h per square meter in the southwest of Iran to 5.4 KW/h in the central regions.

The Ministry of Industry and Mines is also currently interested in new mineral processing technology as part of its plans to expand mineral exploitation and export, while the Ministry of Energy is focusing on water and wastewater management technology. In addition, some petrochemical complexes are looking to modernize and streamline their operations in order to increase their energy efficiency.

Market Access Issues

The Iranian market is complex and can be difficult. Any foreign company considering doing business there should proceed with caution.

Atieh Bahar recommends using local agents and representatives, particularly when a sale requires significant follow-up and technical support. Few local agents specialize in the environmental sector as a whole, rather they work within sectors that have strong environmental requirements and offer opportunities for environmental firms.

Major Competition

Following is a list of some of the companies active in water and wastewater management, both in consulting and construction activities.

1. AVE Company,
2. Zolal Iran Company
3. Mahab Ghods Company
4. Ab Andish Company
5. Ozone Company

Useful Information Sources / Websites

Department of Environment: www.irandoe.org

Tehran Municipality: www.cityoftehran.com

Air Quality Control Company: www.aqcc.org

United States Energy Information Administration:

www.eia.doe.gov/emeu/cabs/iran.html