

Israel National Report

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THEME-SPECIFIC ISSUES

CHEMICALS

Introduction

The chemical industry plays an important part in Israel's economic development, comprising some 20% of GDP by industry and a growing share of the country's exports (from 11.1% in 2000 to 22.1% in 2008).

Safe use and regulation of chemicals is an essential component of Israel's environmental policy. The main frameworks for chemical management in Israel are the Licensing of Businesses Law, 1968 and the Hazardous Substances Law, 1993. Enforcement includes supervision on the sales and acquisition of chemicals and supervision on the import of chemicals (by Israeli Customs).

Moreover, in recent years, an Integrated Pollution Prevention and Control (IPPC) approach was introduced into the major industrial hotspots: Ramat Hovav in the south, Ashdod on the southern Mediterranean coast and Haifa Bay in the north of the country.

Assessment of Chemical Risks

Mechanisms for systematic evaluation, classification, and labeling of chemicals, including initiatives towards a harmonized system of classification and labeling of chemicals

At present, the existing frameworks for industrial chemical management in Israel regulate the user of chemicals by means of stringent measures for "cradle to grave" supervision of the production, import, storage, storage, processes, wastes and transport of chemicals. A tender for comparative analysis of different chemical management systems, including REACH in Europe and TSCA in the USA, was published in 2010, to be followed by selection of the preferred mechanism for chemical management in 2011. It is anticipated that a new administrative unit for chemical assessment and registration will be set up in 2012 and that implementation will commence in 2013.

Following is a short synopsis of the mechanisms currently in use in Israel:

- **Hazardous Materials Permit:** Under the Hazardous Substances Law (1993), a Hazardous Materials Permit is required for the holder of any chemical, whether the substance is in its simple form, mixed, or blended. A permit is only granted if the official appointed by the Minister of Environmental Protection is satisfied with the applicant's familiarity with the features of the hazardous substances in his possession and with their safety requirements. Permits specify the types, quantities and compositions of chemicals in the facility. They also impose restrictions on the quantities and conditions of use of these materials for the protection of man and the environment. The holder of a permit is required to maintain a hazardous substances register in which details of all sales and purchases of hazardous substances are recorded. These record books facilitate tracking of the movement of hazardous substances throughout the country and illegal trade. A fully computerized system classifies all permit holders into sectors and categories.
- **Israeli Standard for Labeling and Marking of Dangerous Substantives:** Israel Standard (IS) 2302 on *Classification, Packaging, Labeling and Marking Dangerous Substances and Preparations* (revised in 2009) presents a mandatory harmonized system that regulates the labeling of chemicals (partly correlating to the EEC Dangerous Substances Directive). IS 2302 specifies labeling requirements for chemicals in-house, during transport from facility to facility within the same compound, and during the transport of dangerous substances by road or rail.
- **Labeling of transported chemicals:** Regulation of the transport of hazardous substances rests with the Ministry of Transport. The ministry imposes specific requirements for packing, labeling and vehicle marking. The Transport Services Law of 1997 and its 2001 regulations regulate the transportation of dangerous substances and largely correspond to the UN Recommendations on the Transport of Dangerous Goods - Model Regulations (The Orange Book). All transported hazardous substances are marked according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and include information on the manufacturer or importer of the substance, warning

marks, emergency codes, action to be taken, UN number, and telephone number of an information center.

Additionally, while Israel has not yet formally ratified the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) and its protocol, it implements most of the provisions in practice.

- **Information and Response Center for Hazardous Substances:** The Information and Response Center collects quantitative and qualitative information on hazardous substances that are used, produced, imported, exported, transported and disposed of in Israel. Data relate to quantities, types, characteristics and concentrations of substances found in all sectors and at all levels, including industry and institutions on the local, regional and national levels. In addition, the Center maintains data on safety, detection, identification, treatment, and neutralization procedures for chemical accidents.

Initiatives for assessment of toxic chemicals, hazard and risk assessment

Currently, registration and licensing of chemicals is carried out on pesticides, pharmaceuticals, cosmetic preparations and food additives.

Pesticides used for agricultural and public health purposes constitute a significant percentage of all chemicals in Israel. The use of these pesticides is carefully supervised to ensure environmental health and safety. The Ministry of Agriculture's Plant Protection and Inspection Service is in charge of the registration and regulation of pesticides for plant protection – constituting most of the pesticides used in Israel. The Veterinary Services of the Ministry of Agriculture use the same process to register pesticides for veterinary use. Monitoring of pesticide residues is carried out by the Ministry of Agriculture and the Ministry of Health.

Registration of Pesticides for Agricultural Use

The pesticide registration process begins with testing and investigation over a period of two years, following provisional approval for limited use. When comprehensive toxicological data have been gathered, an advisory committee, composed of representatives of several ministries, including Environmental Protection, Health, Industry, Trade and Labor, as well as representatives of consumers, decides whether

to approve the product for final registration. Materials are assessed for their environmental impact, endurance, risk to groundwater and other factors.

For the purpose of registration, the Pesticides Division of the Plant Protection and Inspection Services has established criteria for submitting a toxicology file to the interministerial committee for coordination of pesticide use. The criteria are largely based on European directive 91/414/EC concerning the placing of plant protection products on the market

Registration of Pesticides for the Protection of Public Health

The registration process for pesticides for public health purposes is separate from that for agricultural use. Israel's regulations, approved in 1994, comply with strict international standards and require applications for the registration of a new molecule, new formulation, renewal and change of name/label/packaging, etc. The regulations require the officer responsible for pesticide registration to consult with an interministerial professional committee, composed of representatives of the Environmental Protection and Health Ministries. Applications must be accompanied by specification of the composition of the pesticide, copy of the proposed label, toxicological file on the impact of the material on humans, the environment, flora and fauna, material safety data sheet, and more.

Registration of Pharmaceuticals

The Pharmaceutical Administration of the Ministry of Health is responsible, *inter alia*, for the registration of drugs. Each application is accompanied by detailed documentation that relates to the results of a wide array of clinical and other experiments. Registration is only granted following thorough review of these documents as well as the receipt of a certificate of quality from the Institute for the Standardization and Control of Pharmaceuticals

Emergency Response and Risk Assessment

The Information and Response Center for Hazardous Substances assists response teams during emergencies. It conducts assessments based on data received from the field, such as location, type of hazardous substance, type of incident (including spills,

odors, fires, explosions and transport related accidents, etc.) and, at times, data collected previously on materials held on site and on scenarios.

The Center uses both computerized databases that include information sheets on response during accidents and software on analysis of accidents in which hazardous substances are involved. Software for calculating the dispersion range of pollutants in the atmosphere is used to provide estimates within minutes. Other types of software facilitate calculation of risk ranges of flammable and explosive materials.

Risk Management Plan

A risk management manual which relates to risk reduction from industrial sources involving chemicals and to minimizing their impacts on public health and the environment was published by the Ministry of Environmental Protection. According to the manual, any premise which is subject to a Hazardous Materials Permit for a regulated substance and is included in a list of especially toxic or flammable substances is required to prepare a risk management plan. The risk management plan, largely based on the California Accidental Release model (CalARP), includes, *inter alia*, the following elements:

- An offsite consequence analysis that evaluates specific potential release scenarios, including worst-case and alternative scenarios.
- A 5-year history of accidental releases of regulated substances from the covered processes.
- An integrated risk prevention program.
- An emergency response program that includes a set of actions to be taken in different contamination scenarios by the industry and external aid and rescue forces.

A pilot program was initiated by the Ministry of Environmental Protection, with the participation of three industrial plants in each district. The industrial plants were required to prepare and submit risk management plans according to the format prepared by the ministry.

Participation in various international and regional initiatives

The State of Israel has signed and/or ratified several international treaties on the use of chemical substances:

- **The Stockholm Convention on Persistent Organic Pollutants (POPs):** Israel signed the Stockholm Convention in May 2001 and intends to proceed with its ratification. Both the Ministry of Agriculture and the Ministry of Environmental Protection largely comply with the provisions of the convention. Moreover, the pesticides listed in Annex A and B of the convention are banned in Israel. A tender will be issued in 2010 to assess the steps needed for the ratification and implementation of the convention.
- **The Rotterdam Convention on Prior Informed Consent Procedure for Hazardous Chemicals and Pesticides (PIC):** Israel signed the Rotterdam Convention in 1999 and expects to ratify it in 2010. At present, the convention is partially implemented by means of import licensing requirements for chemicals associated with security, health and environmental risks.
- **The Basel Convention on the Transboundary Movement of Hazardous Waste:** Israel ratified the Basel Convention in December 1994. National regulations on the import and export of hazardous waste, which were promulgated in 1994, provide the legal basis for implementing the convention in Israel.
- **Vienna Convention on the Protection of the Ozone Layer and Montreal Protocol on Materials that Deplete the Ozone Layer:** Israel ratified the Vienna Convention and the Montreal Protocol in 1992 and promulgated regulations for the implementation of the Protocol in 2003.
- **Strategic Approach to International Chemical Management (SAICM):** Israel was part of the Dubai declaration. Many of the country's laws, regulations, activities and know-how facilitate the move toward SAICM in Israel.

Strategies for exposure assessment and environmental monitoring and improvement in procedures for using toxicological and epidemiological data to predict and estimate the effects of chemicals on human health and the environment

Recommendations on Guideline Values for Chemical Pollutants in the Air

A report entitled "Ambient Guideline Values for Chemical Pollutants in the Air" was published in March 2006, with guideline values for 110 chemical pollutants in the air which are considered harmful to human health. The guidelines define, for each of the chemicals, both long term exposure limits and short term exposure limits. The Ministry of Environmental Protection has adopted these guideline values and uses them as essential tools in decision making processes on the following:

- Approval and licensing of new facilities in industry or expansion and changes to existing facilities;
- Reviews of health risks to the population in case of exposure to a given pollutant; and
- Assessment of the necessity to reduce pollutant emissions from different sources if pollutant concentrations in the air exceed guideline values.

Sampling of Exotic Pollutants in Haifa Bay

Within the framework of the action plan for the prevention of industrial air pollution in Haifa Bay, an air quality sampling project was implemented in 2007 and 2008. The following air pollutants were sampled: suspended particulates, heavy metals, hydrogen chloride, ammonia, hydrogen sulfide, mercaptans, volatile organic compounds, polyaromatics, dioxins and furans, aldehydes and ketones. In each of the measurements, air was collected for a 24 hour period and the contents were analyzed in specialized laboratories to determine the composition and concentration of the substances in the air. The findings were analyzed and compared to ambient air quality standards and to the recommended health guideline values, enabling the Ministry of Environmental Protection to identify existing and potential emission sources and to take steps targeted at reducing pollution emissions.

Protecting Public Health

The Ministry of Health is responsible for protecting public health including, *inter alia*, supervision of drinking water quality and regulation of chemical, pesticide and herbicides residues and hormones in food. The specialized units in the Ministry of Health that deal with environmental health include the Environmental Health Unit which supervises the quality of drinking water supplied to the public and issues permits for wastewater irrigation food related businesses, and the Public Health

Additionally, the Ministry of Health, in cooperation with the Ministry of Environmental Protection, coordinates many epidemiological surveys. Following are some examples:

- Cancer, death, children's sicknesses and hospitalization were studied between 1990 and 1999 in the Hadera area, near a coal power station;
- Association between air pollution and daily counts of hospital admissions and emergency rooms visits were studied in the Haifa metropolitan area between 1996-1999;
- Prevalence of cancer, lung diseases, cardiovascular diseases and breathing problems were studied in the Haifa area where the petroleum industry is concentrated, during 1995-2004;
- Beginning in 1990, a survey related to allergies, asthma, lung diseases and emergency room admissions was conducted in the Ashdod and Ashkelon area where coal power stations operate;
- A few surveys were conducted in the Tel Aviv metropolitan area regarding the relation between air pollution and many symptoms. One was carried out in collaboration with the US Environmental Protection Agency (EPA);
- A long term study (1994-2005) was conducted around the Ramat Hovav industrial area. The survey monitored cancer prevalence, lung diseases, cardiovascular diseases, newborn malformations, admittance to emergency rooms, hospitalization, mortality and particularly newborn mortality;
- A 10 year survey was recently initiated among soldiers working near the Ramat Hovav industrial area.

Risk in the Workplace

Israel's main arm for supervising safety regulations is the Labor Inspection Service of the Ministry of Industry, Trade and Labor. The Labor Inspectorate is responsible, mainly as a regulator, for workers' health and safety in all workplaces and has focused on especially hazardous substances which put more workers at higher risks. The Labor Inspectorate also promotes applied and basic research in all relevant fields,

including the development of databases. It has published several regulations regarding specific dangerous substances:

- Total banning of materials considered to be carcinogenic.
- Setting of threshold limit values for exposure to such materials as benzene, vinyl chloride, arsenic, mercury, lead, halogenated hydrocarbons, aromatic hydrocarbons, isocyanides, organic phosphates and carbamates, metals such as cadmium, nickel, chromium, cobalt and beryllium.

Carcinogenic, Mutagenic and Teratogenic Materials

National concern over the long-term health effects of a number of materials has led to the establishment of an interministerial committee on carcinogenic, mutagenic and teratogenic materials. The committee chairman is the general director of the Ministry of Health, and the committee includes representatives of the Ministry of Industry, Trade and Labor, Ministry of Agriculture, Ministry of Environmental Protection, Israel Institute for Occupational Safety and Hygiene, and Israel's health care services (Sick Funds). The committee acts as the professional body for assessing the effects of chemicals on human health and advising on ways and procedures to prevent or minimize the negative health impacts of exposure to chemicals. The committee is responsible for updating the lists of substances that are considered to be carcinogenic, mutagenic and teratogenic.

Sound Management of Toxic Chemicals

Progress within the larger framework of Strategic Approach to International Chemicals Management (SAICM)

Israel endorses the Strategic Approach to International Chemicals Management (SAICM), took part in the Dubai declaration and nominated a focal point for SAICM.

Relevant government agencies work according to the SAICM when formulating their work plans and regulative instruments in order to achieve risk reduction, governance, accountability and responsibility. Furthermore, special attention is paid to increasing public awareness, transparency and participation and ensuring wider technical cooperation among all stakeholders. Currently, Israel is in the process of forming an interdisciplinary committee for SAICM and of screening gaps and activities needed.

Israel already implements some elements of SAICM within the framework of its laws, regulations and activities. Examples include:

- Commitment to the Responsible Care program by many member companies of the Manufacturers Association of Israel.
- Establishment of Community Advisory Panels (CAPs) in which representatives of chemical companies, regional NGOs and the public take an active role.
- Adoption of the ethical code of the International Federation of the Pharmaceutical Manufacturers' Association by the Manufacturers Association of Israel.
- Establishment of an Israeli Cleaner Production Center in 2001, as a joint project of the Manufacturers Association of Israel and the Ministry of Environmental Protection.
- Initiation of a pilot program by the Ministry of Environmental Protection, requiring industry to submit risk management plans, based on the Californian guidance document and the US Risk Management Program guidelines.

Future plans include:

- Establishment of an Industrial Chemicals Registration Mechanism, with implementation expected to commence in 2013
- Establishment of a Pollutant Release and Transfer Register (PRTR), with a pilot study planned for 2010 and gradual implementation beginning in 2012.

Initiatives and innovations for risk reduction, particularly taking in to account the life cycle of the chemicals

Israel has a wide body of legislation and programs aimed at the reduction of risks from existing chemicals, such as workers' health and safety provisions; requirements for Material Safety Data Sheets (MSDS); official standards on the classification, labelling, packaging and marketing of industrial chemicals; terms and conditions in Hazardous Materials Permits, surveys and monitoring programs.

Moreover, the Ministry of Environmental Protection regularly reviews information about chemicals that may pose health and environmental risks. In accordance with this information, policies are prioritized restricting the use chemicals that have multiple influences in their lifecycle.

Policy measures to phase out chemicals that pose unreasonable and unmanageable risk to human health and human environment, such as, for example, ozone-depleting substances

Ozone-Depleting Substances

Israel signed, ratified and implements the Montreal Protocol and its subsequent amendments. Israel's regulations on the subject relate to:

- Reduction of methyl bromide consumption;
- Halons;
- Chlorofluorocarbons (CFCs);
- Reduction of hydrochlorofluorocarbons (HCFCs) consumption.

The Ministry of Agriculture established a procedure for distributing the approved methyl bromide quantities for plant protection while the Ministry of Environmental Protection is responsible for distribution of methyl bromide for uses related to structures, commodities and objects. The distribution of methyl bromide quantities for critical uses is granted according to the amounts allocated by the parties to the Montreal Protocol for critical uses in Israel. Since 2005, the use of methyl bromide is restricted and controlled by the Ministry of Agriculture jointly with the Ministry of Environmental Protection.

Reduction in methyl bromide for uses other than plant protection has been achieved by implementing the following alternatives:

- Integrated pest management;
- Thermal disinfection;
- Mixture of methyl bromide\CO₂ – allowing for a reduction in methyl bromide dose by 50% (used for date packing houses);
- Controlled atmosphere.

As of 2011, no methyl bromide will be allocated for post harvest dates (and for any other post harvest use) following the successful conclusion of a two-year research project, facilitating the use of heat in all post harvested date varieties. In addition, ethyl formate has recently been registered as an alternative for post harvested date treatment.

The Ministry of Environmental Protection is reviewing a revision to the existing regulations aimed at further restricting the use and control of ozone depleting chemicals. The revision would include aspects such as:

- The provisional use of recycled containers rather than disposables;
- Safe procedures for maintenance and installation of air conditioning systems (avoiding ODS emissions);
- Recovering controlled materials from machinery and equipment during servicing or prior to disposal.

Some of the proposed regulations are already in effect as official standards. For example, the obligatory standard for air conditioners was amended in 2005 to prohibit the use of HCFCs in new air conditioners. Using the same tool, the use of HCFC 141B for most foaming materials has been restricted.

Pesticides and Biocides

The use of pesticides for agricultural or public health purposes is carefully supervised to ensure environmental health and safety. In 1997 a revision of all registered pesticides and biocides was initiated, resulting in the ban of 11 active ingredients. Emphasis was given to restricting or banning chemicals that were previously authorized for use. Specifically, chemicals with long DTs (time required for 50% of the initial deposit to dissipate) are not granted a sales license.

The following materials were banned or severely restricted after 1997:

1. Sodium Arsenite
2. Pentachlorophenol
3. 2,4,5-TP
4. Monocrothophos

5. Ethyl Parathion
6. Chlorphenapyr
7. Aldicarb
8. Hexasuron
9. Dinitro-o-cresol
10. Methoxyethylmercuric chloride
11. Ethylmercuric chloride

In addition to agricultural pesticides, Israel regulates (by a separate process) pesticides for public health purposes and wood preservatives. The regulations stipulate a number of cases in which registration may be denied, revoked, suspended or made conditional upon the fulfillment of prerequisites. Registration may be denied, for example, if the pesticide poses a risk to humans, the environment, flora or fauna. It may also be denied if another registered pesticide exists for the same purpose, which is less harmful to humans, the environment, flora, or fauna, or if the pest has developed resistance to the active ingredient as demonstrated by testing in the Entomological Laboratory of the Ministry of Health.

Based on these conditions, several formulations have either not been approved or have been revoked or restricted in recent years, including:

- **Acute rodenticides:** Acute rodenticides containing fluoroacetate or zinc phosphide have been banned in the public health sector due to their toxicity to humans and the environment and due to the lack of an effective antidote. The revocation was made possible by the existence of alternatives such as anticoagulants.
- **Chromated Copper Arsenate (CCA) for wood preservation:** CCA is the general term for chemical formulations containing three components: inorganic arsenic, six-valent chromium and copper, used to protect wood from pests. Inorganic arsenic and six-valent chromium have been defined as known carcinogens. In light of potential dangers during fire and during wood processing and in light of indicators about the possibility of the leaching of carcinogenic materials to the environment due to wear processes and in accordance with the precautionary principle, Israel decided not to approve

formulations for wood protection which contain CCA and to approve alternative wood preservatives. In parallel, Israel decided to ban the import and processing of wood treated with these materials.

- **Chlorpyrifos and diazinon:** The Ministry of Environmental Protection has banned the use of pest control products containing the organophosphates chlorpyrifos and diazinon. In recent years a growing body of evidence has accumulated regarding previously unknown risks from these materials, including to embryos and infants due to the exposure of pregnant women and babies to chlorpyrifos and diazinon.

Policies and frameworks for prevention of accidents, preparedness and response

In case of accidents involving hazardous substances, an integrated emergency response system is imperative. To this end, Israel has developed a national emergency contingency plan for integrated emergency response in hazardous substance accidents. The plan's main aims are to rescue human life, prevent and reduce risk to the population and minimize environmental damage. The plan delineates the tasks of the bodies that will participate in the response, both individually and collectively, including the police, the fire and emergency services, and the Ministry of Environmental Protection.

Entities and Responsibilities

- The police – responsible for commanding and coordinating treatment at the site of the accident;
- The fire and emergency services – responsible for initial activities at the site of an accident (extinguishing fires and evacuating casualties);
- MDA (ambulance service) – responsible for clinical diagnoses and prioritizing the evacuation of casualties to hospitals after initial on-site treatment;
- The Ministry of the Environmental Protection – responsible for detection, monitoring, and risk assessment as well as for recommendations to the commander in charge on such measures as population evacuation, closure of surrounding areas, transfer of hazardous substances to the national hazardous waste disposal site at Ramat Hovav and site remediation.

Responsibilities of the Chemical Industry

The plan imposes first responsibility for treatment of a chemical accident on the industrial plant itself. Israel's industries are required to take all necessary steps to prevent accidents, to prepare emergency procedures, to train staff, and to prepare suitable equipment and safety gear. In line with these requirements, the Manufacturers Association of Israel has prepared a comprehensive survey on potential means of dealing with chemical accidents that occur during the transport of hazardous substances.

Sequence of Actions

The emergency response system is based on the division of the country into ten central risk areas. In case of a hazardous material accident, an immediate response team is dispatched to the site. The country's emergency bodies (police, fire and emergency services, and ambulance service) are required to arrive at the site within ten minutes of notification. The emergency response team of the Ministry of Environmental Protection must arrive within 30 minutes of notification.

In the case of the Ministry of Environmental Protection, six district offices, each with a designated response team and a mobile laboratory unit, are responsible for accidents occurring in the ten risk areas. The teams work under the professional guidance of the Hazardous Substances Division of the Ministry of Environmental Protection. The response team is responsible for preliminary assessment of the accident, detection and identification of the hazardous substances and risk assessment. The regional response teams are backed up by a national mobile unit that fulfills such services as response, calibration, equipment supply, maintenance, guidance and field advice to the district response teams and local units.

The Information and Response Center for Hazardous Substances plays an essential role in the system, coordinating among the various response forces, collecting data from the scene and from the Meteorological Service, performing complementary risk assessment and providing essential information and analysis services.

Major resources have been allocated toward implementation of the emergency contingency plan with special emphasis on training exercises and simulation

techniques as well as review of the theoretical literature. A special training center for hazardous substances was established by the Ministry of Environmental Protection to promote education and information in this area. The center instructs and trains all public services including the police, fire and emergency services, army units, hospitals and other medical services that deal with catastrophes involving hazardous substances.

Policies aimed at reducing the risks posed by lead, mercury and cadmium and other harmful heavy metals, including through a review of relevant studies, such as, for example, the United Nations Environment Programme global assessment of mercury and its compounds

Mercury

Emission and environmental standards for mercury are imposed in licenses and permits pursuant to the Licensing of Businesses Law, 1968 and Hazardous Substances Law, 1993. Israel has eliminated the use of alkyl-mercury compounds in agriculture and mercury compounds in the pulp and paper industry. Maximum possible reduction in the discharges of mercury from mercury cell chloralkali plants was achieved by the closure of a facility that did not comply with emission standards, and only one other mercury cell chloralkali facility currently exists in Israel. This facility substantially reduced its mercury emissions pursuant to the conditions of its Hazardous Materials Permit. Restrictions also exist for the use of mercury in toys.

Lead

The use of leaded gasoline has been banned in Israel. In addition, instruments such as laws and regulations, permits, licenses and official standards limit exposure to lead in areas such as: drinking water; workplace exposure to lead; effluent discharges from industry; irrigation water; permitted discharges to sea water; contaminated soil removal; and air emissions. Restrictions also exist for the use of lead in paints, toys and ceramic utensils. In addition, programs exist for the collection and recycling of lead-acid batteries and electronic waste.

Initiatives to reduce overdependence on the use of agricultural chemicals

Reduction of pesticide use is an important goal which aims to reduce environmental exposure to these materials. Pesticide regulations are meant to prevent potential

damage from uncontrolled exposure to pesticides. National Maximum Residue Limits have been established for all pesticides in Israel that are based, whenever appropriate, on the Codex Alimentarius Limits. The Ministry of Agriculture supervises and regulates quality and health requirements of exported agricultural produce and cooperates with international bodies on standardization of pesticide tolerance regulations.

In Israel, several projects have been initiated to promote integrated pest management. They include, among others, use of cover crops to protect the soil surface, insect-proof nets, insect traps, and natural enemies. Important progress has been made in the development and introduction of beneficial natural enemies (e.g., predatory mites, predatory beetles, parasitic wasps) as alternatives to conventional chemical pesticides. Projects range from the use of pheromone traps, to commercial production and application of the *Bacillus t. israelensis* (BTI) to control moth and water-breeding insects, to use of bees to biologically control strawberries from pests, to release of barn owls to effectively control rodent populations in farming areas.

The barn owl project, implemented at Kibbutz Sde Eliyahu, uses raptors as an environmentally friendly and economically profitable solution for eliminating rodents from agricultural fields and plantations. In January 2009, a contract was signed between the Ministry of Environmental Protection, the Ministry of Agriculture and the Society for the Protection of Nature in Israel to promote the use of barn owls and kestrels as biological control agents in agriculture. (http://www.sviva.gov.il/Environment/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals^l6013&enZone=ipm).

The development of organic agriculture promises further reductions in environmentally harmful agricultural practices. The Israel Bio-Organic Agriculture Association (IBOAA) is a member of the International Federation of Organic Agriculture Movement. Produce supplied by certified IBOAA growers is cultivated according to rigorous bio-organic principles: soil fertility is maintained through balanced organic nutrition and monitored plant rotation; insects, pests and disease are controlled solely by biological means, such as laboratory-bred natural enemies; produce is never treated after harvesting; and natural resources are carefully

conserved. Furthermore, greenhouses are heated only by the sun's rays and water is strictly rationed using Israel's advanced irrigation techniques.

Furthermore, Israel has enacted standards, laws and regulations on organic produce including the 2005 Law for Regulation of Organic Produce, the 2008 regulations on organic plants produce (production and sale, certification and preparations used during production) and the 2006 Israeli Organic Standard (Plants).

MINING

Introduction

There are 85 active quarries in Israel and about 2000 non-active and abandoned quarries. All are open pit mines – extracting raw materials for the building and road construction industries or phosphates for the chemical industry and the agricultural sector. There are no underground mines or coal, metal, precious stone or similar mines in Israel.

Extracted raw materials for the year 2008 included:

- Dolomite – used as aggregate for cement and asphalt.
- Chalk – used as aggregate for cement; marble replacement; mosaic for the flooring industries; and chalk dust for the food industry, medicinal purposes and the color industry.
- Sand – used for the cement industry and as a fill material.
- Gypsum and clay for the building industry.
- Clay for fireproof industries.
- Silica sand for glass.
- Soft limestone and soil as bedding.
- Tuff and red sandy soil for gardens.
- Phosphates.

Over the past few decades, especially since the establishment of the Ministry of Environmental Protection and the formulation of the National Master Plan for Mining and Quarrying (approved, in stages, between 1998 and 2001), aspects of resource management and sustainability were adopted in the mining sector. Currently, the National Master Plan for Mining and Quarrying is undergoing comprehensive revision incorporating new strategies for sustainability in the mining sector. Additionally, many of the non-active quarries are in different stages of rehabilitation planning, or undergoing rehabilitation by the Quarry Rehabilitation Fund (QRF).

Policy and Regulations

Features of national mining codes or mineral industry code

Mining in Israel is regulated by two main legislative and statutory mechanisms:

- **The Mining Ordinance of 1925 and the ensuing 1973 and 1978 regulations:** This ordinance specifies conditions and parameters for obtaining a mining permit. The later 1978 regulations led to the establishment of the Quarry Rehabilitation Fund that oversees the restoration of non-active quarries (see '*Mine Closure Planning*' for an expanded description of the activities of the Quarry Rehabilitation Fund).
- **Spatial planning:** The National Master Plan for Mining and Quarrying (Plan 14) specifies approved mining and quarrying sites. Plan 14 regulates the mining of natural resources with the aim of ensuring reserves up to the year 2020. Additionally Plan 14 specifies instructions for site restoration, noise nuisances, air pollution, water contamination, and requirements for environmental impact assessment.

In July 2005, the National Planning and Building Board decided to update the National Master Plan for Mining and Quarrying based on forecasted needs for the year 2040 (Plan 14b). This revision includes a comprehensive new approach to environmental issues and sustainable development. The proposed revision of Plan 14 aims at: "ensuring the mining reserves of raw materials for the building and road construction industries up to year 2040, whilst complying with the principles of sustainable development."

To obtain this end, Plan 14b, recommends six principles and subsequent policies for sustainability:

1. Ensuring the needs of future generations for raw materials

- **Basing all new mining activities on long term integrative planning:** For example, spatial planning of communities, nature conservation, post-mining potential, and development of new rail and transport infrastructure will all be taken into long term consideration to minimize land use conflicts and maximize resource utilization.
- **Internalizing environmental externalities in the pricing of raw materials:** Traditionally, the mining industry's policy was to continuously lower the price

of raw materials, encouraging rapid and 'wasteful' mining. Internalizing externalities in the pricing of raw materials is expected to balance demand, whilst creating price incentives for efficient mining and increased use of recycled materials.

- **Limiting the export of raw materials:** Israel is a small, densely populated country, with an ever growing demand for raw materials. A policy of limiting the export of mining materials is recommended to ensure the needs of future generations. The exception to this policy is trade with the Palestinian Authority which is largely considered to be part of the Israeli market.

2. Minimizing the environmental and health effects of mining activities

- Prohibiting new mines in highly populated areas and in proximity to localities.
- Obliging mines to comply with updated standards by applying Best Available Technology (BAT) to overcome the problem of long term licensing during which time environmental standards may change.
- Establishing a more stringent enforcement and inspection system to oblige quarries to comply with environmental standards and mining regulations.
- Relocating raw material processing devices from the outskirts of mines to the center of the quarry, in a topographically low position, in order to reduce air pollution and other hazards resulting from mineral processing activities.
- Internalizing transport considerations in new mining activities. Increased transport of raw materials by rail is recommended in order to reduce air pollution, road congestion and greenhouse gas emissions. It is estimated that about 30% of all road cargo transport in Israel is related to mining activities.

3. Balancing pressures for development, on the one hand, and the need to preserve open space, on the other hand

- Refraining from mining in open areas of high ecological sensitivity even if not protected as a nature reserve, national park or agricultural land.
- Giving preference to enlarging existing quarries rather than opening new sites. The expected environmental benefits include better use of available infrastructure, such as roads, communication lines, power supply and

processing devices, thereby reducing fragmentation and sustaining the continuity of natural open spaces.

- Clustering mining activities in order to sustain the continuity of natural open spaces and minimize their adverse visual effects.
- Designating mining cluster areas of low visual and ecological sensitivity.
- Limiting the mining of raw materials that involve high environmental cost and are obtainable from other sources. A preliminary analysis of Plan 14b found that the mining of some raw materials is associated with high environmental cost in comparison to their economic benefit:
 - a. **Sea sand:** Over the past decades, sand areas along the Mediterranean Sea have been reduced dramatically. This is attributed to rapid urban development and massive sea sand mining. Currently it is prohibited to mine sea sand dunes. Plan 14b recommends that sand should be harvested from two designated areas in the central south of Israel, that sand import from Jordan and Egypt should be promoted, and that "quarry sand" should replace sea sand use.
 - b. **Soft limestone coastal ridge:** The current National Master Plan for Mining and Quarrying (Plan 14) designates some of the soft limestone coastal ridge for mining. In recent years there has been growing awareness of the ecological uniqueness of the coastal ridge, which is home to many rare species, endemic species, and endangered species of flora and fauna. Therefore, the revision of Master Plan 14 (Plan 14b) prohibits extraction of limestone in the coastal ridge.
 - c. **River-bed materials:** River-bed materials are mined for their special aggregates in the building of water reservoir embankments, fish ponds and the like. There are four active riverbed quarries in Israel extracting 0.5 million ton per year. These quarries have a cumulative adverse impact on the natural river channel. Therefore, Plan 14b proposes to limit riverbed mining to special needs.
 - d. **Phasing out the mining of some raw materials:** Plan 14b proposes to phase out the mining of gypsum, tuff, chalk for marble, chalk for lime, chalk for plaster and chalk for mosaics. These materials are extracted in small quantities and may be imported or replaced by other elements.

- Limiting the establishment of new open hillside quarries to visually restricted areas, thus minimizing the visual adverse effect on the landscape and on heritage, leisure and recreation sites.
- Internalizing aspects of landscape rehabilitation in the early process of mine planning.
- Integrating elements of flood prevention and aquifer water infiltration in the early planning of the mining site.

4. Wise use of land reserves ensuring the provision of raw materials for the building and road construction industries

- Expanding research and development on underground mining vis-à-vis the common practice of open land mining.
- Promoting wise development planning in areas rich in natural resources.

5. Wise and efficient consumption of raw materials alongside demand and supply management

- Increasing mutual planning and cooperation between the mining sector and the construction sector, thus attaining better resource use efficiency and minimizing non-useable waste.
- Controlling resource supply management via pricing, regulation and awareness raising with the aim of increasing the use of secondary materials and recycled construction waste.

6. Balancing national economic benefits with local negative impacts, including environmental impacts on local communities

- Developing plans for social and environmental responsibility between the mining companies and surrounding residents.

Fiscal policies for investments and counteracting market fluctuations

The overall government policy is to let the mining market act as a free market with no fiscal government interference. Quarry rehabilitation is financed by the Quarry Rehabilitation Fund (see below *Mine Closure Planning*).

Regulations and mechanisms for compliance and monitoring

Compliance and monitoring of the mining industry are regulated by five different tiers:

- **Local authority:** The local authority approves an annual business license for mining sites within its jurisdiction. The business license includes specification of mining conduct and environmental standards. Mines and quarries that do not comply with the conditions in their license are shut down.
- **Regional Planning Commission:** The regional planning commission supervises the fulfillment of conditions specified in the approved mining plan. Where mines do not comply with their land use planning specifications, mining activities are stopped.
- **The Israel Land Administration:** The Administration enforces the payment of royalties to the government.
- **The Ministry of Environmental Protection:** The Ministry of Environmental Protection monitors compliance with legal environmental stipulations in relation, *inter alia*, to air pollution, noise nuisances, vibrations, etc. The Ministry operates two main inspection bodies: the Green Police and the Israel Police Environmental Unit. (http://www.sviva.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Zone&enDispWho=inspect_body&enZone=inspect_body)
- **The Ministry of National Infrastructure:** The Mining Commission within the Ministry of National Infrastructure supervises mining activity. The Mining Commission works in cooperation with the Israel Land Administration and the Ministry of Environmental Protection. Twice a year, the Mining Commission compares mapped aerial photos of the mining sites with the approved mining plan. Misconduct by the mining company can lead to mine shutdown. Additionally, the Mining Commission enforces illegal mining, which in most cases is *ad-hoc* quick resource extraction. In such cases, Mining Commission inspectors along with police officers are authorized to confiscate involved vehicles and machinery.

Guidelines for artisanal, small and medium scale mining

Israel's mining guidelines are uniform regardless of mining size. For more information on mining codes, see above *Features of national mining codes or mineral industry code*.

Public/Stakeholder consultation and participation in decision-making related to mining

In Israel, the most recent mine was opened in 1993, and no new mines are expected to be opened in the foreseeable future. New mining activities within existing mines are subject to the approval of the local and regional planning committees. According to Israel's Planning and Building Law, all new plans are publicized and are open for public review and opposition. Additionally, each planning committee includes a public representative not related to local or national government.

In addition, the preparation of the revised National Master Plan for Mining and Quarrying (Plan 14b) is based on stakeholder consultation and public participation. All relevant ministries, organizations and public associations are taking part in the formulation of the plan, and it is expected that details of the proposed plan will be presented to the public prior to advancing the plan to the stage of statutory approval. A public hearing is expected at the stage of reviewing alternatives to the statutory plan.

Public governance and transparency in the mining sector

The Freedom of Information Law (1998) requires the different tiers of mining governance to provide any resident with requested information.

The Ministry of Environmental Protection, the Ministry of National Infrastructure, the National Planning and Building Board and the Israel Land Administration have comprehensive websites with a wealth of information on mining activities, spatial planning, mine location, regulation, and annual reports of site rehabilitation.

Some 2000 abandoned quarries were identified throughout the country in a comprehensive survey conducted by the Quarry Rehabilitation Fund. Detailed parameters of each quarry, including location, size, volume, rock type, and reserves are included in a GIS map which is accessible to the public on the website of the

Mining Best Practices

Environmental Impact Assessment (EIA) and monitoring of all phases of mining operation (exploration, project development, mine operation, and mine closure)

Environmental impact assessment (EIA) regulations are integrated into Israel's planning system, requiring assessments for all projects likely to have environmental impacts. The regulations set guidelines for the preparation of EIAs and require their review by the Ministry of Environmental Protection. In 2003, the original regulations were broadened to require EIAs in environmentally sensitive areas, such as coasts and riverbanks and to incorporate sustainable development principles, including land, water and energy conservation.

In terms of environmental policy, the Ministry of Environmental Protection has prepared a list of environmental criteria applying to new mining operations:

- Number of residents living in a radius of 1000 meters from the quarry.
- Prevention of mining nuisances such as dust and vibrations resulting from mining activities.
- Prevention of air pollution as a result of mining activities and transport.
- Concealment capacity of the quarry in order to minimize its visual impact on the surroundings.
- Topographical suitability of the mining plan.
- Nature conservation as a result of mining activities or site transport.
- Protection of archeological sites within the mining area or as a result of other infrastructure.
- Examination of hydrological sensitivity and prevention of aquifer pollution.
- Protection of the continuity of open spaces, ecological sensitivity and biodiversity.
- Prevention of pollution, nuisances and traffic disturbance due to the transport of mined materials.
- Consideration of significant negative impacts on the image and reputation of the surrounding area.

- Prevention of adverse impact on agricultural activities in the surrounding area.
- Prevention of negative impact on tourism and related activities.

Emergency Response Plans and Preparedness at the local level

In Israel there are no underground mines, and all mining activities are undertaken in open sites with a relatively low risk factor. Conditions for site safety and emergency response are specified in the business license of each mine.

Risk assessment of mines and mining activities

Risk assessments of mines are conducted within the framework of environmental impact assessments. Under conditions of uncertainty regarding the effects of blasts on surrounding communities, permanent vibration sensors are installed and monitored.

Technological, institutional and social initiatives for protecting the health of mining workers

The Ministry of Industry, Trade and Labor supervises all safety and health aspects of mining workers. Mining activities are regulated by the Work Safety Ordinance (Stone Mining) 1965, Safety at Work Ordinance 1970, and Use of Explosives Regulations 1994. The regulator specifies, among others, conditions for:

- Appointment of a site manager – age and qualifications.
- Site mapping and signposting.
- Conditions for stonecutting and aggregate clearing.
- Conditions for loading and unloading of substances.
- Use of explosives.
- Periodic health inspections of workers.
- Use of equipment and safety requirements.

Mine Closure Planning (Land use plans & site rehabilitation, site safety, decommissioning, waste dumps & tailings, site water management, off-site infrastructure, community socio-economic programs and employees)

The 1978 regulations of the Mining Ordinance (1925) led to the establishment of the Quarry Rehabilitation Fund (http://mine-rec.mni.gov.il/index.php?tPath=1_2_94),

responsible for overseeing the restoration of non-active quarries. There are about 2000 abandoned quarries in Israel.

The responsibilities of the QRF are:

- To collect a fee from the mining company. The fee is a percentage of the average resource market price and may be as low as 0.1% for cement or lime and up to 6% for natural soil.
- To promote the site rehabilitation plan.
- To fund and supervise all phases of site rehabilitation.

The QRF is administrated by eight members including representatives of the Ministry of Environmental Protection, Israel Land Administration, Nature and Parks Authority and Ministry of National Infrastructure. Site rehabilitation starts only when it is clear that there are no further resources to extract from the mine and it is officially declared fully exploited. All plans for site rehabilitation must be approved by the regional planning committee, and responsibility for maintenance must be accepted by the beneficiary of the renovated site.

The QRF manages an endowment of more than NIS 300 million (\$75 million), with an average annual expenditure of over NIS 16-17 million (more than \$4 million). The QRF has already rehabilitated or partially rehabilitated 230 projects and deals with 50 ongoing restoration plans annually. Quarry restoration plans include a variety of projects, such as transforming old quarries to regional parks, playgrounds, water reservoirs, open air theaters, industrial zones, multilevel graveyards, and more.

Quarry Restoration: Prominent Examples

Numerous examples of successful quarry restoration exist in Israel: an abandoned hillside quarry at the outskirts of the city of Nazareth was used as a structural base for building a highway to the city, a restored quarry was transformed into a water reservoir near Kibbutz Neve Yam and the abandoned Samar sand quarry in Israel's southern area was transformed into a sand dune park.

Yet, without doubt, the most notable example of quarry rehabilitation is the Land of Craters (*Eretz Hamakhteshim*): On the bedrock of the Central Negev hills (in the south of Israel), desert erosion has created sharp, angular crater-like features which are unique to Israel and the Eastern Sinai deserts – *makhteshim*. The Central Negev Desert boasts five *makhteshim* of different sizes, each representing a different stage of development, the largest of which is known as the Ramon Crater. These craters are characterized by mineral rich soil, colorful sand dunes and special rock formations. The presence of rich mineral deposits side by side with the other unique features in the craters has resulted in extensive exploitation of the minerals and damage to this ecosystem. Recognition of the conflict between mining and quarrying and nature conservation and desert tourism led to a government decision dated July 1994 (decision no. 3494) to stop mining and promote the planning and development of the this Land of Craters for nature conservation and desert tourism

A master plan for the Ramon Crater was prepared in cooperation with the relevant stakeholders including the Mitzpe Ramon local council, the Nature and Parks Authority and the Israel Lands Administration. The plan was then presented to the general public and following input from all stakeholders, rehabilitation plans were presented to the planning committees for approval.

The QRF is currently implementing a rehabilitation plan for the Ramon Crater mining area, spanning some 400 hectares. In recent years, it invested some NIS 14 million (about \$3.5 million) out of NIS 28 million in the first phase of the rehabilitation which includes earthworks, drainage schemes and polishing steps including the dispersal of topsoil and rocks on this desert surface. Some 20 quarries have been rehabilitated to date in parts of the Ramon Crater, some of them transformed into camping grounds and others integrated into the crater landscape. The next phase will see the establishment of trails and paths for hikers, cyclists and field vehicles, explanatory signs on the geological formations and the creation of a water body. Completion of this major quarry rehabilitation project will see the transformation of a severely disturbed area into a national park, providing a rare window into a world of color and singular geological formations.

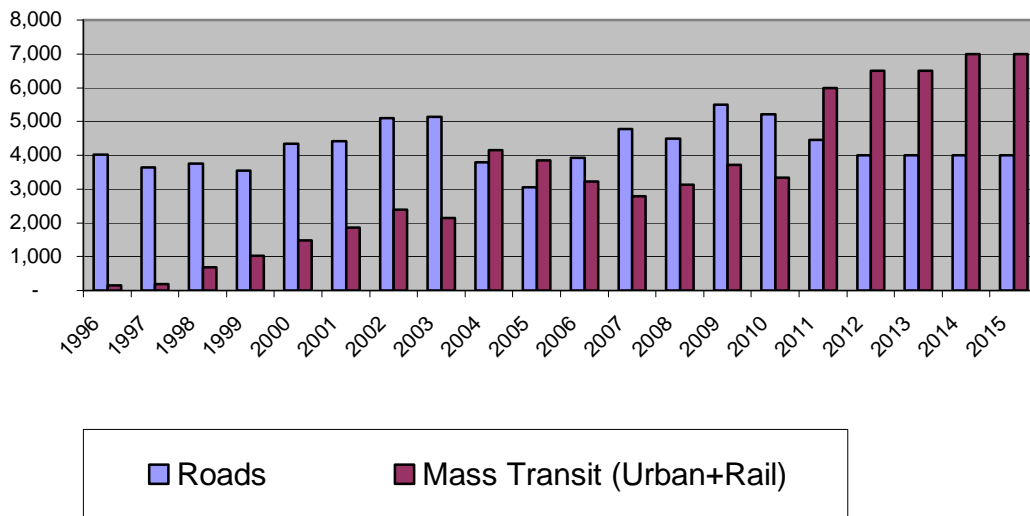
TRANSPORT

Introduction

Rising standards of living in Israel coupled by a significant growth in population have led to a steady increase in the number of motor vehicles in Israel, a growth in motorization level and a rise in distance traveled. During the last decade, the transport infrastructure investment to GDP ratio more than doubled, from 0.6% to 1.6, one of the fastest growth rates recorded worldwide. This trend is expected to continue and further accelerate, with annual investment expected to exceed \$3 billion through traditional budgetary resources and public private partnerships (PPP).

Israel's unique economic and demographic characteristics present a real challenge for policy makers. Adjusting the transport sector to these special circumstances requires long-term planning and allocation of substantial economic resources. It is imperative for Israel's government to adopt a balanced and prudent transport policy that can provide a real solution to growing requirements while addressing sustainable environmental needs, reducing congestion and increasing road safety. Thus, government policy emphasizes the expansion of public transport, mainly rail systems and mass transit systems, in order to mitigate the adverse effects of transport activities. The following chart demonstrates the allocation of major financial resources to mass transit transport, at a scale previously unknown in Israel, from some NIS 100 million (about \$25 million) in the late 1990s to a forecasted NIS 7 billion (about \$1.75 billion) in 2015. At the same time investments in roads have remained steady.

Investment in Roads Vs. Mass Transit
(1996-2009 - Actual, 2010-2015 Forecast)
In Million NIS. (\$1=NIS 3.75)



Policies and progress on transport access, including the rural population and poor

Israel's standard of living has significantly increased over the past two decades, reflected in the rise in the number of drivers and vehicles. The number of vehicles in Israel has more than doubled, from approximately 1 million in 1990 to approximately 2.5 million today, while the population has grown by approximately 53%. Thus, the level of motorization has risen from 220 vehicles per 1,000 residents to 330 vehicles per 1,000 residents (despite this steep rise, Israel still lags behind Europe and the U.S.A in the number of car owners). The increase in car ownership presents a twofold challenge for sustainable transport:

- Developing efficient and affordable public transport.
- Providing better road infrastructure, thus reducing traffic congestion and accidents.

Improving Public Transport Management

In January 2008 the Ministry of Transport and Road Safety published a comprehensive report: *Recommendations and Conclusions of the Committee for Inspection of the Reform in Public Transport in Israel*. The 50-page report

recommends new mechanisms and policies to improve public transport, including the establishment of two transport authorities:

- A national public transport authority: The authority will regulate the quality of transport services, transportation routes, timetables and establishment of a national information center for public transport commuters. It will encourage the accessibility of public transport to marginalized sectors of society such as Bedouins, ultra orthodox Jews, the disabled, residents in the periphery, and schoolchildren.
- A Tel Aviv regional metropolitan public transport authority: The Tel Aviv authority will regulate all aspects of the urban mass transit system in the metropolitan area.

Subsidized Public Transport

Government policy is to subsidize public transport fares, regulate destinations and set service frequency. In 2009, direct subsidies for public transport operators exceeded NIS 2.2 billion (\$600 million). Most of this budget (about NIS 1.9 billion or \$500 million) were allocated to subsidize bus and train fares and to maintain service to remote destinations that are otherwise not economically justified. Additionally, the government supports public transport companies in their annual procurements and renewal of their bus fleet. The government also subsidizes public transport fares for children and senior citizens. These subsidies include discounts in bus and train fares:

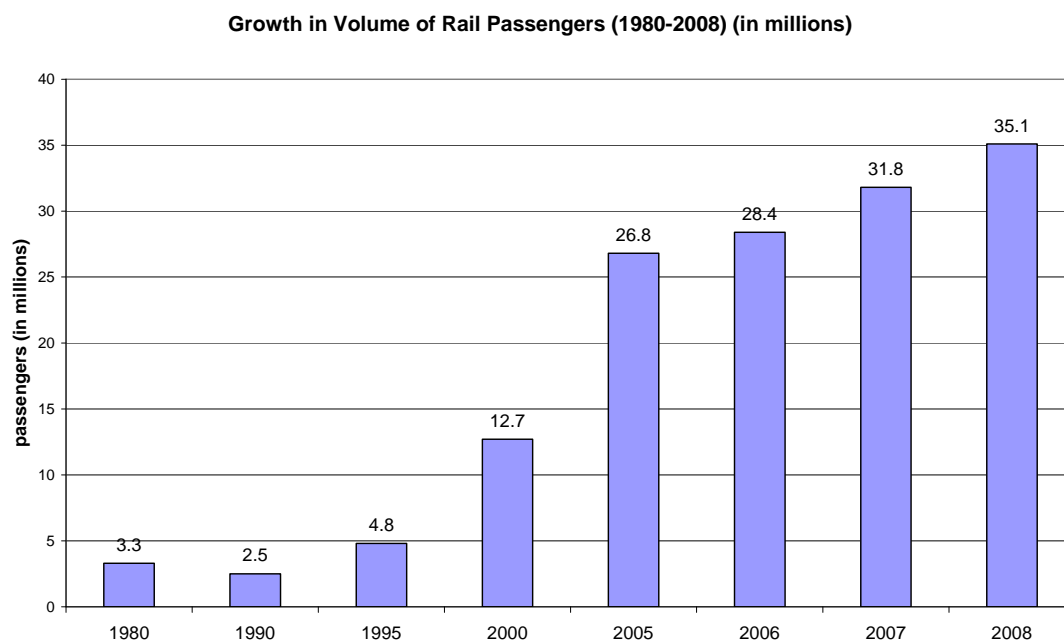
- Free travel for children under 5 years old accompanied by an adult.
- Discounted fares for schoolchildren.
- A 50% fare discount on urban and inter-city travel for senior citizens over 65.
- A semestrial city bus pass at a reduced price of up to 50% for university and college students in selected cities including Tel Aviv, Jerusalem, Haifa, Safed and Beer-Sheva.
- Discounted fares for entitled welfare beneficiaries of the National Insurance Institute of Israel.

In addition, over the past decade public bus transport in Israel moved from a service dominated by two major companies (Egged and Dan) to a multi-company service. New bus operators were introduced mainly in peripheral regions but also in more

central areas, usually, small companies with greater flexibility. As a result, costs were cut and service frequency rose.

Israel Railways

Israel's government views railways as a central mean of mass transport which is both efficient and environmentally prudent. The train is also viewed as a means for reinforcing the connection between metropolitan centers and the periphery, improving standards of living, providing employment opportunities, increasing commuter mobility, protecting the environment and providing sustainable development. After many years of stagnation and a steady decline in passenger volume, Israel Railways has begun actively working towards bridging the wide gap between Israel and other developed countries in the use of rail travel. Since the mid 1990s, passenger volume has grown rapidly (by over 1300% since 1990). It is expected that the annual number of passengers will increase from the current 35 million to some 60 million in 2015.



Rail Investment

In an effort to realize the immense potential inherent in the development of the rail system, both in terms of passengers and freight, the government decided in 2001 to transform the Railway Authority into a governmental company. This step facilitated the implementation of organizational efficiency measures. The organizational change

was accompanied by a government decision to invest \$7 billion in a multi-year program, to be implemented by 2016, to establish a rail connection between all major and medium-sized Israeli cities.

The government's vision, as embodied in the multi-year development program, was to connect by rail the four major metropolitan areas (Jerusalem, Tel Aviv, Haifa and Beer Sheva) and establish a suburban rail network in the Tel Aviv metropolitan area. Other major projects in the program include upgrading of the signaling system and initial steps for electrification of the network.

In February 2010, this program was supplemented with an additional \$5 billion program which aims to connect Haifa to Beit She'an and Acre to Carmiel at a total cost of nearly \$2 billion and to convert the railway system from diesel locomotives to electric trains while renewing the rolling stock at a cost of about \$3 billion.

Following is a look at some of the major projects:

- **The Tel Aviv-Jerusalem Express Line:** The flagship project for coming years is the Express Line (A1) between Tel Aviv and Jerusalem, which will connect Israel's two main centers with a journey time of 28 minutes. The route is only 56 km (35 miles) long but a major part of it (20 km or 12.5 miles) runs through hills and mountains, requiring the construction of tunnels as well as the construction of a central station in Jerusalem 80 meters (260 feet) underground. The first section, between Tel Aviv and Modi'in, was completed in 2008. The section between Modi'in and Jerusalem is expected to be completed and operational in 2016. The line is planned to carry 6-7 million passengers a year.
- **The Eilat Railway (in planning):** The city of Eilat lies at the southernmost tip of Israel and is a major tourist destination. Eilat is also the southern gateway to Israel, acting as the port of entry for goods from Southeast Asia, Africa and Australia. Connecting Eilat by rail to the center of the country is expected to significantly benefit international trade, tourism and the development of Israel's southern region. The project plan will be completed by 2016.

- **The Eastern Railway Line (in planning):** The planned Eastern Railway Line is located alongside Road 6 - the Cross Israel Highway. The line will run from Lod to Hadera and will complement the Coastal Line. It will be used to carry freight and passengers. The Eastern Railway Line is a strategic project due to its potential to incorporate an inland port, which will serve to transfer freight to and from the Haifa and Ashdod seaports. The estimated cost of the project is \$1 billion and it is expected to be built in cooperation with the private sector (PPP).

Road Infrastructure

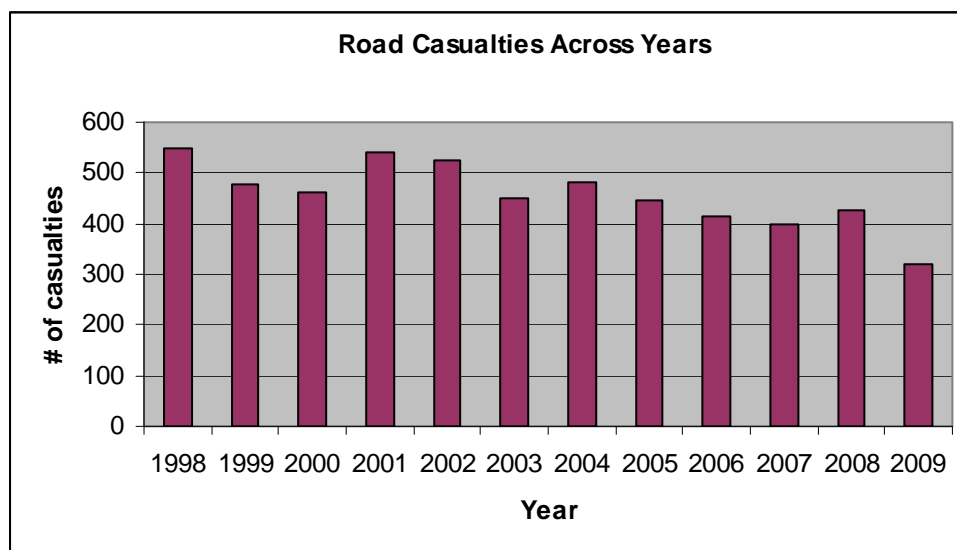
In recent years, within the framework of the government's balanced approach to transportation planning and in an attempt to meet the growing demand for road transportation alongside the development of public transport, the government invested an average of NIS 3.5 billion (nearly \$1 billion) annually to implement large-scale road infrastructure projects. Several roads in Israel, including the Cross-Israel Highway, were advanced as a result of fruitful cooperation with the private sector, in the form of Build-Operate-Transfer projects. Some of the main road infrastructure projects include:

- **Road 22 (Krayot bypass):** The new road is expected to provide a real solution to traffic problems in the Haifa metropolitan area. The project will accelerate the development of the region including the construction of thousands of housing units. The total cost of the project is estimated at \$500 million, with operation expected to start in 2015.
- **Road 16 (Jerusalem Entrance):** The project will improve access to the capital city and lower traffic congestion. The total cost of the project is estimated at \$350 million. The project is being examined for implementation as a Build Operate Transfer (BOT), with operation expected to start in 2015.
- **Cross Israel Highway:** A large section of the toll highway (Highway 6) crossing Israel South-North has already been completed. Plans have been approved to extend this major highway further north.
- **Fast lane on Highway 1 entering Tel Aviv from the east:** Under construction.

- **Carmel Tunnels (Haifa):** This road, under construction, will enable traffic flow in a tunnel bypassing the urban center of Haifa.
- **531 Lateral Feeder Road from Kfar Saba to Ra'anana:** Under financial closure.

Road Safety

Israel's government accords high priority to reducing the number of road accidents. To attain this end, the National Authority for Road Safety Law was enacted in 2006. The Road Safety Authority develops work plans and budgets for integrated activities with the police, the judicial system, media, local authorities and others to combat road accidents. In recent years, Israel has witnessed a sharp decrease in the number of fatal casualties in road accidents (see chart below), despite a 40% increase in car transportation volume.



Improving Road Network Management

An important element in government policy relates to increased road capacity by means of more efficient use of existing infrastructure:

- Implementing Intelligent Transport Systems (ITS) for traffic control and management (under development): The main aim of operating ITS is to improve the efficiency of existing transport infrastructure, increase the level of road safety, improve services, protect the environment and reduce costs.

Various ITS technologies are being implemented or are planned for implementation in Israel, such as:

- Traffic monitoring and data distribution.
- An integrated public transport database.
- Emergency and special event management
- Adopting economic incentives (e.g., congestion toll) for optimization of demand management.
- Relieving traffic congestion on major highways, mainly by widening existing roads.
- Increasing road safety by improving proper road maintenance.
- Separating local and intercity traffic, mainly through developing bypass roads.

Road Planning: Context Sensitive Solution Planning

Israel is a small and highly populated country with a limited supply of open spaces. The conservation of open spaces and environmental protection are a key ingredient in road planning guidelines issued by the Ministry of Transport and Road Safety. The guidelines instruct road planners to implement a newly developed method of Context Sensitive Solution (CSS). The CSS guideline is a tool enabling planners to minimize the social and environmental negative impact of new transportation facilities. The CSS guidelines include:

- Methods to identify sensitive elements in the planning sphere. As a result, planners are enabled to change the planned elements of the project, such as driving speed, layout of the intersection, etc.
- Instructions on making changes without compromising the other elements of the project plan, such as infrastructure safety and service provision.

It is expected that several advantages will result from enabling a wide perspective alongside greater flexibility in transport planning project: costs will be reduced, less open spaces will be consumed and adverse environmental impacts will be minimized.

National Master Plans

Land use planning in Israel is regulated by the different levels of national, regional and local planning committees. At the end of 2005, the National Planning and

Building Board approved the Comprehensive National Master Plan for Building, Development and Conservation (known as Plan 35). This plan specifically calls for urban development to be adapted and linked to transportations systems, especially mass transit. It instructs the editors of local and regional plans to concentrate development contiguous to the public transportation axes and in direct relation to them. Additionally, a new national master plan is in preparation – the Comprehensive National Master Plan for Land Transport Infrastructure (Plan 42). The aim of Plan 42 is to set instructions for a national land transport system that is integrative, efficient, sustainable, and economically developed. The plan is expected to make efficient use of Israel's scarce land resources, to minimize social inequalities, to promote pluralism, and to protect the environment. It sets ten preliminary goals that include:

- Reversing the trend from commuting by cars to public transport commuting.
- Setting the national layout of transport infrastructure, in order to improve and prioritize public transport services.
- Extending the synergy between transport planning and land use planning, and improving the economic efficiency of the transport system.

Fuel prices and tax reform

Removing subsidies on fuel

September 2009 marked the conclusion of a four year fuel tax reform to match the taxation on diesel and gasoline. At the same time, the diesel annual car licensing fee was reduced to match the fee on gasoline engine cars. This reform was designated to reduce economic distortions influencing the choice between diesel and gasoline powered cars and subsequently environmental pollution. Large businesses and industries that depend on diesel fuel for income generation are entitled to apply for diesel tax refunds. Buses and taxis are also included in this refund scheme.

Regional and global transport system integration encouraging efficient modes.

Rail transport

Israel's Ministry of Transport and Road Safety is promoting planning of the Jezreel Valley Railway Line (Ha'Emek Railway) connecting Haifa through Beit She'an to the

Jordanian border. This will allow the efficient transfer of freight from Europe and the US through the Haifa seaport to Middle East countries such as Jordan and Iraq, shortening the current maritime route by thousands of kilometers, significantly reducing trading costs and contributing to the sustainable development of the region. Because of its importance as a regional project, this railway line is being promoted by the European Union and is expected to attract the involvement of international organizations in its finance and implementation.

Maritime transport

The vast majority of Israel's international trade is conducted by sea and the main commercial ports (in Haifa, Ashdod and Eilat) handle 98% of the country's import and export volume. In the last decade the amount of cargo passing through Israel's ports has doubled and this trend is expected to continue as international trade expands further.

In December 2006, the Israel Ports Company presented the Minister of Transport and Road Safety with its proposed Fifty Year Strategic Master Plan for the development of port infrastructures along the Mediterranean coast, with government approval following in the beginning of 2007. The plan provides both a long and a short-term vision. It calls for the development of Haifa and Ashdod ports in a phased approach based on demand growth, with special emphasis on improving the level of service and increasing competition. The plan further recognizes the potential to exploit Israel's unique geographical position as a maritime gateway to the region as the geopolitical climate improves.

The government has also decided to advance plans for building additional container terminals in Haifa and Ashdod ports (each containing a 1.2 km long pier) at an investment of \$1 billion for each terminal.

The Israel Ports Company has taken the first steps towards implementing the government decision and has chosen two international maritime engineering firms to complete the detailed design of the terminals. The planning of these new projects is accompanied by stringent environmental impact assessment. Issues of water quality,

seabed conservation, biodiversity, marine ecosystem rehabilitation and sea sand erosion are taken into consideration.

Motorways of the Sea

Activities to encourage efficient sea transportation are taken as part of the European Union plan known as *Motorways of the Sea*. The main aim of this plan is to improve port communications with peripheral regions of the European continent and thus strengthen the networks between countries and encourage sea and train movement of goods vs. transportation by trucks.

Urban transport planning and policies

Mass transport projects

Israel is predominantly urban (93% of the population lives in towns with more than 20,000 inhabitants). Planning policies continue to encourage high-density urban development capable of supporting public transport. Additionally, in recent years special bus lanes were constructed throughout urban centers to enable free flow of public transport.

Specific projects of mass transport are at different stages of planning and implementation in the urban metropolitan areas of Tel Aviv, Jerusalem and Haifa:

The Jerusalem light rail train

With over 730,000 residents in an area of 126 sq. km (31,500 acres), Jerusalem is the largest city in the country, both in population and in size, with its population expected to reach 900,000 by 2020. Due to socioeconomic factors, public transport is widely used in the city. In 2002, the CityPass Group, a consortium of local and international companies, won the tender to build and operate the first light rail line in Jerusalem.

The main objectives of the project include:

- Encouraging the use of public transport.
- Revitalizing the city center.
- Reducing noise and air pollution and encouraging businesses and pedestrians to return to the city center.

- Reducing traffic congestion across the city.

Work on the project began at the end of 2006 and the line is scheduled for operation by May 2011. The electrically powered light rail train will be able to accommodate more than 500 passengers in one ride and will run every 4.5 minutes during rush hours. The first line of the train includes a 14 km strip of light rail crossing the city of Jerusalem. An impressive component of the first line is the new 120 meter-long bridge situated across the main (western) entryway to Jerusalem, which was commissioned from the leading international bridge designer and architect, Santiago Calatrava.

The construction of the light rail in the city center is accompanied by urban regeneration of the public sphere – roads, sidewalks, business fronts and construction of bicycle lanes. Additionally, the light rail project has incorporated a general upgrade in the public transport of the city: designating special bus lanes, prioritizing public transport in traffic lights, restricting the entrance of private cars to the city center and changing the city's ticketing system.

The Tel Aviv Metropolitan Mass Transit System (NTA)

The Mass Transit System – Tel Aviv Metropolitan Area is an advanced mass transit system that will enable the Tel Aviv metropolitan area to continue to develop and to provide adequate access to the city center. After years of planning, preliminary work has begun on the first line (the Red Line). The light rail, which will travel above-ground and underground at high speed and high frequency, will connect central Tel Aviv to large urban centers. (<http://www.nta.co.il/site/en/neta.asp?pi=40>)

The main objectives of the project include:

- Providing high level public transport services to reduce private car use.
- Significantly reducing travel time.
- Reducing traffic congestion in the city and access roads.
- Providing an incentive for urban development and renewal along the new route and around the stations.
- Reducing air pollution.

The MTS Group, a consortium of international and local companies, won the tender. The first line should be fully operational by 2015.

Bus rental stations in Tel Aviv

The Tel Aviv municipality with the support of the Ministry of Transport is in the process of establishing a network of automatic bicycle rental stations in the city. Rentals will be by means of a credit card, without prior reservations. During 2011, about 100 bicycle rental stations are expected to be operational, with over 2000 bicycles available for rental. This scheme is expected to encourage the use of environmentally friendly transport and complements the establishment of a wide network of bicycle lanes in the city of Tel Aviv city. In future this scheme is expected to be expanded to the neighboring cities of Tel Aviv.

Haifa Transport Master Plan Administration

The Haifa transport consortium is the active planning body of the Ministry of Transport and the city of Haifa. It is responsible for planning and development of integrated transport in the city of Haifa and Israel's northern region. The consortium is currently active in:

- Formulating the transport policy for the Haifa metropolis
- Reevaluating the public transport system
- Preparing a master plan for parking in Haifa
- Planning bicycle trails in Haifa bay
- Formulating a master plan for road safety
- Implementing traffic regulations

The Haifa Transport Administration runs three main projects which are in different stages of implementation:

- **The Bus Rapid Transit (BRT) "METRONIT"**: This project aims to build a new network of high capacity hybrid powered buses that run on exclusive rights of way. The first line is planned to connect the urban center of Haifa bay (the Krayot) to the transport centers of lower Haifa. The line is expected to be operational at the end of 2011.

- **Haifa Cable Car:** The unique topographic structure of Haifa makes it very difficult to connect different sections of the city. In an attempt to connect the city's lower area (at sea level) with Haifa University and the Technion (Israel Institute of Technology) situated on top of the Carmel Mountain, a plan has been drafted to build a 4 km cable car. Investment in the project is expected to reach some \$45 million. The project, which will carry 5,000 passengers an hour, has proved to be economically feasible and is expected to significantly shorten travel time and divert passengers from private cars to public transport.
- **Mass Transit System on Road 79 Nazareth-Haifa Bay:** The project aims to improve the connection between two major urban centers in the north (Haifa and Nazareth) and will encourage the use of public transport. The total cost of the project is estimated at \$900 million. The project is being examined for implementation as a BOT (Build Operate Transfer) project.

Joint governmental and non-governmental initiatives

A joint initiative of Transport Today & Tomorrow (a non- governmental organization (NGO)), the Ministry of Environmental Protection and the Ministry of Transport is entitled Green Commuting. (http://www.s-t.org.il/info_en.asp?id=-364706580) The project seeks ways to reduce car use in home-to-work trips. In the initial part of the project, three policies are under consideration:

1. Building preferential parking for people that arrive at work by carpool.
2. Establishing the legal framework for working from home.
3. Revoking the legal basis for current practices in the public sector that link salary payments to car ownerships.

On the practical level, the project is developing means to encourage workers to commute via carpooling, public transportation, cycling, etc. Israel Railways is now offering a special program granting businesses a 17% discount for employee travel. In addition a shuttle system will be established from train stations to nearby employment regions. (http://www.s-t.org.il/index_en.asp#).

Vehicle efficiency and emissions policies

National Plan for the Reduction of Vehicular Pollution

A national action plan, designed to reduce pollutant emissions from vehicles, was approved by government decision in October 2007. The decision calls on the Ministries of Environmental Protection, Infrastructures, Transport and Finance to take a wide variety of steps, including:

- Setting mandatory emission standards for smoke emissions from diesel vehicles and carbon monoxide emissions from gasoline-powered vehicles, adapted to each vehicle model;
- Allocating a special budget for the recruitment of inspectors for air pollution tests conducted in vehicle licensing bureaus;
- Authorizing Green Police inspectors to order owners of vehicles that do not comply with emission limits to stop using their vehicles;
- Calling on the Ministry of Transport and Road Safety to prepare a pollution reduction program for the center of Tel Aviv which is based on restricting the movement of polluting vehicles;
- Implementing a plan for the scrapping of old vehicles, which will offer owners payment for transferring their old vehicles for scrapping and metal parts recycling;
- Calling on the Ministry of Transport and Road Safety to renew roadside air pollution tests for vehicles by its enforcement patrols which check the working order of vehicles;
- Calling on the relevant officials in the Ministry of Finance and the Tax Authority to present a program for encouraging employees to reduce their private car use and switch to public transportation or other alternatives that reduce private car use;
- Imposing a differential tax on vehicles, based on the "green index" published by the Green Tax Interministerial Committee;
- Prohibiting the movement of heavy vehicles on main traffic arteries during peak hours, with the exception of vehicles designated for passenger transport;
- Giving preference in tenders for service vehicles in government agencies to fuel-efficient, environment friendly vehicles;
- Establishing a national vehicle laboratory to assist in checking vehicle compliance with advanced standards and to contribute to wise decision making on the subject.

- Reviewing the advantages and disadvantages of electric cars charged from the national electricity grid and recommending policy within a year.
- Setting significant economic incentives for promoting alternatives fuels, which are not oil-based, as well as diesel substitutes.

Green Tax Reform

The purchase tax on private cars in Israel is one of the highest in developed countries and stands at 92% (excluding hybrid cars and electric vehicles). On August 2009, Israel approved a Green Tax reform which seeks to improve vehicle efficiency and reduce emissions. The reform sets price rebates correlating to the degree of reduced vehicular air pollution. Vehicles in the lowest emission category, after the refund, pay a 45% purchase tax. The uniqueness of this reform lies not only in the progressive manner in which car prices are linked to emissions, but also in the fact that the different emission categories are based on "local pollutants" rather than CO₂ emissions alone. Under this new reform, hybrid cars are charged only 30% tax and electric vehicles (with zero emission) 10% tax.

The tax group of each vehicle model is based on the following:

- Air pollution testing of each car model before it is approved for use in Israel, or in Europe or in the USA. The test results provide information on the following pollutant emissions: carbon monoxide (CO), hydrocarbons (HC), nitrogen oxide (NO_x), particulates (PM) and carbon dioxide (CO₂).
- Factoring of the emission data of each model by means of a "green grade." The grades are divided into 15 groups of pollution that form the basis for tax credits, with group 1 representing the cleanest vehicle group and group 15 the most polluting.

The new tax structure has made cleaner and smaller cars less expensive by thousands of dollars, while the cost of polluting cars has increased significantly, thereby incentivizing the public to purchase more environment friendly cars.

Additionally, the changes in the car tax reform include:

- Switch to a linear method of calculating the value of use¹ of a company car. The value of use of a company car is now calculated based on its book value, rather than according to the value of usage groups that were previously used.
- Grant of tax benefits for the import of a diesel vehicle which is equipped with a particulate trap at a rate of NIS 1,500 to NIS 4,000 (more than \$1,000), depending on the type of converter.
- Grant of tax benefits to reduce the use of a company hybrid car by NIS 500 per month (\$130).

Eco-Labeling of New Vehicles

Recent regulations prepared by the Ministry of Environmental Protection require every advertisement for a new vehicle to include data on air pollution, based on air pollutants and greenhouse gases that are emitted from the vehicle. An air pollution level is determined for each vehicle on a scale from 1 to 15, with 1 representing the lowest emissions and 15 the highest. In addition, the vehicle advertisement must include data on laboratory testing of fuel consumption in urban and interurban driving. According to the regulations, advertisements and exhibition halls are required to display a notice in the form stipulated in the regulations. The objective of these regulations is to increase public awareness of the subject in order to allow consumers to choose the most appropriate car for them.

Vehicle Retirement in Israel

A vehicle scrapping program was initiated by the Ministry of Environmental Protection, in cooperation with the Ministries of Transportation and Finance, on January 1, 2010. Owners of vehicles 20 years old or older, equipped with a valid vehicle registration license, are eligible to deliver their vehicles to six authorized scrapping sites and to receive NIS 3,000 (about \$800) from the State in remuneration.

Clean Air Law

The Knesset (Parliament) approved the Clean Air Law on July 22, 2008. The law will go into effect on January 1, 2011. The law provides a comprehensive framework for the treatment and prevention of air pollution by setting responsibilities and imposing

¹ Value of use of a company car - the financial worth of using a company car, calculated per monthly use. This value is added to the individual's income projections and taxed by income tax.

obligations on the government, local authorities and the industrial sector. Among the provisions of the Clean Air Law is authorizing the Ministry of Environmental Protection to deal with vehicular pollution, as follows:

- Determine car emission regulations and standards for license renewal.
- Set standards for fuel quality and components.
- Authority to give personal orders to polluting industries and car fleets.
- Prohibit the use of polluting vehicles until compliance with the standards.

Green Government

On December 13, 2009, Israel's government approved a decision entitled: *"Green Government" - efficient governmental operation*. This government decision aims at setting the Israeli government as an example of sound environmental management that integrates steps for sustainability in its activities. This decision includes guidelines for car procurement:

- A maximum emission rate will be defined for the different car categories in all government car tenders.
- Government car tenders will favor procurement of fuel efficient cars.
- The government car authority will develop instruction programs for fuel efficient driving.

Development of any transport technology research and development (public sector or private)

Better Place

Israel has been chosen by the company 'Better Place' to be one of the first countries in which it will provide a network and services that make an electric car affordable to buy and easy to use. Better Place intends to lease electric vehicles (EVs) and provide a network of charge spots and battery switch stations for powering these vehicles. The company will also provide in-car services to ensure that drivers can confidently drive and plan trips in their EVs and the EV network software to optimize the use of energy and minimize the need for additional electricity generation and transmission infrastructure. For more information see: <http://www.betterplace.com/>

Demonstration and Research Projects

The Ministry of the Environment has initiated four research studies on the most suitable measures for reducing vehicular pollution under Israel conditions. The goal: to demonstrate efficiency in reducing emissions and to check potential impacts on vehicle performance in the first stage and to bring about wide-scale use in polluting vehicles in the second phase. The demonstration projects relate to: diesel oxidation catalysts (DOC), particulate traps in combination with oxidation catalysts, continuous regenerative traps and diesel particulate filters.

The Chief Scientist Division in the Ministry of Environmental Protection has funded numerous research studies on the reduction of pollution from vehicles. Many of the studies were carried out by the Internal Combustion Engine Laboratory of the Center for Research on Energy Engineering and environmental Protection, Faculty of Machine Engineering, Technion, Haifa. Some examples:

- Development of simulation model for regeneration processes in diesel engine particulate traps.
- Development of a proposed standard on periodic inspection of in-use power two wheelers in Israel.
- Survey of the automotive renewable fuels worldwide.
- Fleet tests with garbage trucks equipped by particular traps (filters).
- Implementation of natural gas use for vehicle city buses engines by use of diesel oxygenation catalytic converters.
- Reduction of particulate emissions from urban buses by use of continuously regenerating trap (CRT) diesel particulate traps.
- Estimation of in-use catalytic converters efficiency in Israel

Capacity building needs on transport activity assessment and analysis for integrated planning (e.g., urban transit, congestion relief, non-motorized transit, vehicle efficiency programs development, assessing fiscal incentives, inter-modal freight management systems)

Sustainable Transport at Local Municipalities – a joint initiative of Transport Today & Tomorrow (an NGO) the Ministry of Environmental Protection and the Ministry of Transport - aims to encourage initiatives and comprehensive planning by

municipalities to increase the opportunities for promoting a systematic sustainable approach from within. Two main initiatives are currently in progress:

1. **The Sustainable Transportation in Israel Contest:** This yearly contest invites heads of municipalities, regional councils, and local councils to publicly present transport plans for future projects. The projects propose solutions that are not based on private cars usage and new road building, but rather promote the use of public transport, walking, cycling, changing commuting habits, making the use of private cars more efficient, etc. http://www.s-t.org.il/info_en.asp?id=290483964
2. **Sustainable Transport Course:** This course offers 15 meetings on sustainable transport to city engineers, planners, people in charge of sustainable development, as well as representatives of resident' groups interested in promoting sustainable transport in their cities.

WASTE MANAGEMENT

Introduction

Integrated waste management is an important component of Israel's environmental policy. To address the challenges of both solid and hazardous waste, the Ministry of Environmental Protection has formulated policies founded on reduction at source, reuse and recycling, with disposal as the last priority.

Prevention and minimization and environmentally sound management of hazardous wastes

Appropriate safety and control procedures for handling and treating hazardous substances and their wastes from "cradle to grave" are integral elements in Israel's environmental management program. By means of the Hazardous Substances Law, Israel has instituted administrative and legislative measures to control hazardous substances at every stage of production, storage, transfer, maintenance, use, and disposal. The Hazardous Substances Law obligates any person dealing with a hazardous substance to apply for a Hazardous Materials Permit. The applicant must provide details on the types and quantities of hazardous materials handled and the types and quantities of hazardous waste produced.

Policy measures for the prevention and minimization of hazardous wastes

Israel's policy on hazardous waste is based on minimization, reuse, recycling, neutralization and safe disposal of hazardous wastes, according to the following priorities:

- **Recovery** of the hazardous waste through recycling or reuse.
- **Reuse** of the waste as an energy source through incineration in a facility which recovers the energy.
- **Disposal** of hazardous waste, including landfilling, above-ground collection and incineration without energy recovery.

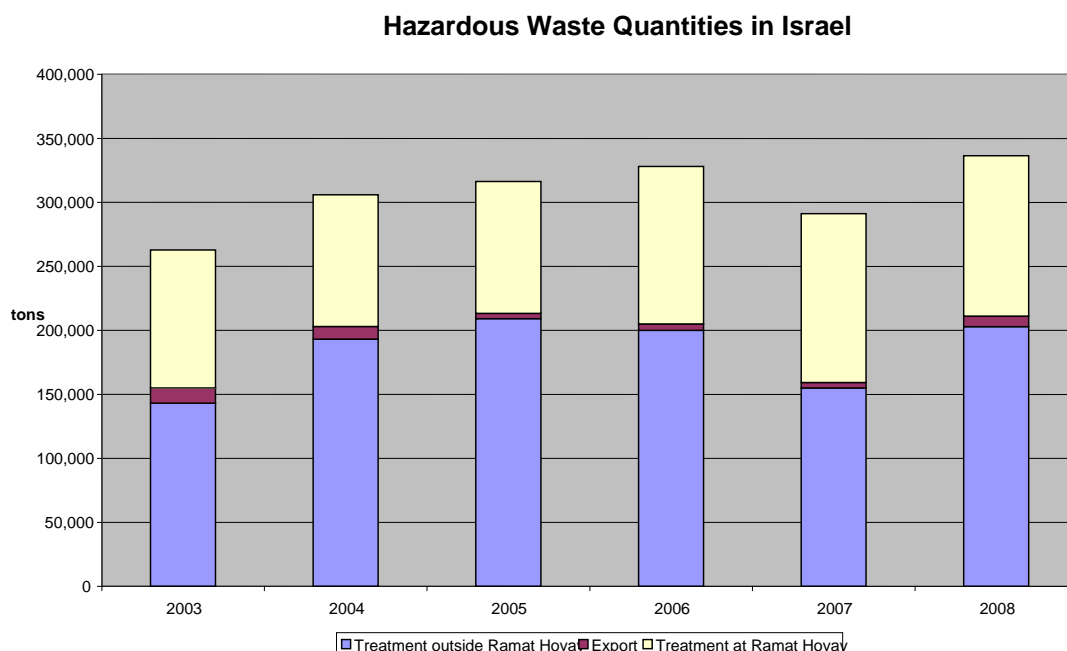
Pollution reduction action plans, which include requirements for best available techniques, have been instituted in the Ramat Hovav industrial zone and in Haifa Bay, Israel's two hotspots of pollution. The Ramat Hovav area in the south of the country includes 17 industrial plants, most of which produce large quantities of wastewater, with a composition and concentration of hazardous substances that are especially difficult to treat. Since the mid-1990s, measures have been taken to upgrade the storage, treatment, disposal and incineration of the hazardous wastes emanating from these industrial plants. Plants are required to stop the discharge of wastewater to the central treatment system and to establish and operate individual sewage treatment systems and evaporation ponds at the plant level in accordance with stringent standards.

In 2008, most of Israel's treated hazardous waste (68%) was disposed, only 2.4% was exported for treatment and the rest was recovered. Although disposal is still the most prevalent treatment method, the trend is beginning to change in accordance with the Ministry of Environmental Protection's policy.

The total quantity of hazardous waste which was treated in Israel in 2008 was 336,458 tons, with the following distribution:

- Hazardous waste which reached the hazardous waste treatment plant in Ramat Hovav (125,400 tons);

- Hazardous waste which reached other destinations for disposal, treatment, recycling and reuse (with prior approval) (202,894 tons);
- Hazardous waste which was exported abroad for treatment/recycling (8,164 tons).



Transfer of environmentally sound technologies and know-how on clean technologies and low-waste production

The Ministry of Environmental Protection and other organizations promote the assimilation of knowledge and know-how on clean technologies by:

- Exposing Israel's industry to new technologies via conferences on selected issues.
- Financially supporting cross-cutting projects which aim to reduce hazardous waste by a number of factories or an industrial sector.
- Organizing international environmental technology conferences and exhibitions that showcase Israel's innovative clean technologies and low-waste production, including CleanTech - the International Summit and Exhibition for Renewable Energy and Water Technologies, Recycling and Environmental Quality, Infrastructure and Green Building (<http://www.mashovgroup.net/cleanTechEnglish/tabid/99/Default.aspx>) and WATEC Israel, the International Conference and International Water

Technologies & Environmental Control Exhibition (<http://watec-israel.com/index.php>)

- Israel's Cleaner Production Center, established by the Ministry of Environmental Protection and the Manufacturers Association of Israel in 2001, provides information on clean production, including manuals for different industrial sectors, case studies and environmental standards. Within the framework of the Center, the Ministry of Environmental Protection has published a call for proposals for assistance to industrial plants in reviewing the feasibility of pollutant reduction at source and more efficient use of resources. Consultation will relate, *inter alia*, to reducing the quantity and/or toxicity of hazardous wastes.

Initiatives to treat, recycle, reuse and dispose of wastes at the source of generation and regulatory mechanisms (Polluter-pays principle)

Israel is intensifying its efforts to increase recycling and recovery of hazardous waste, through, *inter alia*, proposed hazardous waste treatment and disposal regulations that will prioritize reduction at source and recycling. The goal is to have Israeli industries shift from end-of-pipe solutions to treatment at source solutions which include minimization of hazardous waste through reduced use of certain hazardous substances, introduction of clean production technologies and reuse and recycling of hazardous waste.

New regulations on hazardous waste treatment and disposal are currently being drafted under the Hazardous Substances Law. The regulations will introduce three principal changes to the field of hazardous waste:

- A change in the method of defining hazardous waste which will be according to the relevant EU Directives, with the necessary adjustments to Israel's particular conditions and needs.
- Prioritization of hazardous waste management methods, in line with EU policy. Accordingly, Israel's environmental policy will place first priority on reducing the quantity or toxicity of hazardous waste at source; second priority will be given to recycling or reuse of the waste; third priority will be given to using the waste for energy production; disposal of the waste will be the lowest

priority. In order to implement these priorities, once the regulations have entered into force, entities using hazardous substances will be required to prepare a hazardous waste treatment plan, requiring approval by the Ministry of Environmental Protection, as a prerequisite for receiving a Hazardous Materials Permit.

- The regulations will specifically relate to producer responsibility and will include a mechanism for enforcement and inspection of hazardous waste from cradle to grave as well as requirements and guidelines on hazardous waste treatment which are targeted at producers of hazardous waste, transporters, transfer stations and treatment, recycling and disposal facilities

To encourage the reduction of hazardous waste quantities, the Ministry of Environmental Protection grants financial aid to industries for the reduction of hazardous waste volume which would otherwise be sent to the national site for the treatment of hazardous waste at Ramat Hovav. The ministry finances up to 40% of the investment value, with priority to plants in which waste or waste toxicity is reduced at source. The ongoing project has led to a significant decrease in hazardous waste generation in Israel and has convinced industry that economic savings can go hand in hand with environmental improvement.

Furthermore, with the introduction of the Environmental Protection Law (Polluter Pays), 2008, potential polluters are increasingly deterred from mishandling waste. This law links the benefit derived or the profits reaped from committing an environmental offense to the penalties imposed.

Procedures for environmental impact assessment, taking into account the cradle-to-grave approach

Cradle-to-grave management of hazardous substances is incorporated in the provisions of the Hazardous Substances Law. By means of this law, Israel has instituted administrative and legislative measures to control hazardous substances at every stage of production, transfer, maintenance, use and disposal.

Israel's Environmental Impact Assessment (EIA) Regulations of 2003 require EIAs for plans, which in the opinion of the planning authority, may have significant

environmental impact, including wastewater treatment plants and waste disposal sites. In addition, requirements for EIA are incorporated into the regulations of national master plans on waste disposal. The regulations specifically stipulate that sustainable development principles must be incorporated in EIAs.

Recovery, reuse and recycling of hazardous wastes and their transformation into useful material

Hazardous waste is treated, recycled or used as a source of energy both in the national treatment site for hazardous waste at Ramat Hovav and at other authorized sites. All operations are subject to the supervision and approval of the Ministry of Environmental Protection, under the Licensing of Businesses Regulations (Disposal of Hazardous Substances Waste), 1990.

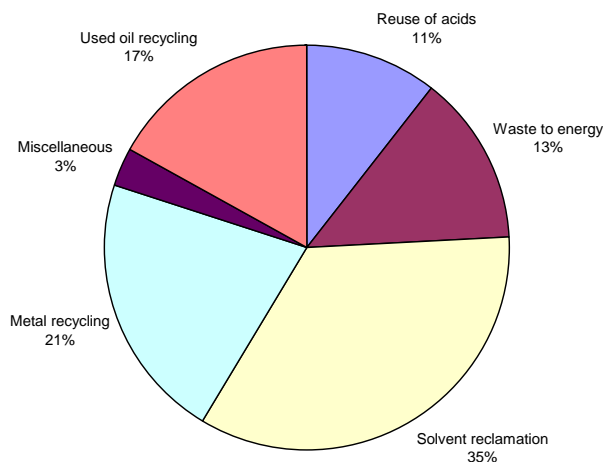
Recycling in Israel centers on the reclamation, regeneration or recycling of the following hazardous wastes: solvents, organic substances which are not used as solvents, metals and metal compounds, acids or bases, and used oil re-refining. Industries have succeeded in safely recycling metal wastes including copper, lead, manganese, tungsten, zinc, gold and other precious metals.

To assure environmentally sound management of hazardous waste facilities, special conditions have been formulated within the framework of business licensing regulations for recycling facilities, waste treatment facilities and transfer stations.

Nearly 99,000 tons of hazardous waste were recovered in 2008, with the following distribution:

- Reuse of acids – 10,556 tons
- Waste to energy – 13,333 tons
- Solvent reclamation – 34,108 tons
- Metal recycling – 21,264 tons
- Miscellaneous (include clinker additive) – 3,004 tons
- Recycling of used oil – 16,692 tons

Hazardous Waste Recovery (2008)



Phase-out of toxic, persistent and bio-accumulative waste

The Ministry of Environmental Protection regularly reviews information about toxic waste that may pose unreasonable health and environmental hazards. In accordance with this information, decisions to phase out the use of chemicals resulting in persistent and bio-accumulative waste are prioritized. For example, permits for PCBs are not granted; the use of alkyl-mercury compounds in agriculture and mercury compounds in the pulp and paper industry has been eliminated; and the use of leaded gasoline is prohibited.

Environmentally sound waste disposal and treatment

Israel's regulations on hazardous waste relate to the disposal, treatment, import and export of hazardous waste. Licensing of Businesses Regulations (Disposal of Hazardous Waste), 1990, require owners of industrial plants to dispose of hazardous wastes originating in the plant, as soon as possible after production and no longer than six months after production, to the national site for the disposal and treatment of hazardous waste in Ramat Hovav, or to transfer it for recycling, reuse or treatment elsewhere, following written approval from the Ministry of Environmental Protection. Some of the waste generated by industrial plants in Israel is treated, recycled or reused in-house.

The hazardous waste treatment plant at Ramat Hovav is operated by the Environmental Services Company Ltd., a government-owned company under the responsibility of the Ministry of Environmental Protection. It handles inorganic, organic, liquid and solid hazardous waste using different treatment processes and technologies: neutralization, detoxification, recycling, on-site incineration, secured landfilling and solidification/stabilization of inorganic waste and solid waste before landfilling .

A comprehensive remediation program for the hazardous waste treatment site at Ramat Hovav was initiated in 2006. At its completion, the site will be transformed into a state-of-the-art plant for the treatment of hazardous waste, complying with the most stringent safety and environmental standards.

In 2008, disposal of hazardous waste in Israel totaled 231,779 tons, which largely consisted of physico-chemical treatments (neutralization/sedimentation/volume reduction with landfilling of the products) (56%) and landfilling (24%) Other disposal methods included incineration without energy recovery (13%) and biological treatment (7%)

Inventories of hazardous waste production, their treatment/disposal, and contaminated sites

- **Pollutant Release and Transfer Register:** The Ministry of Environmental Protection is in the process of building a Pollutant Release and Transfer Register (PRTR). Screening of existing PRTR systems has been completed and the definition of the scope for Israel (including sectors, pollutants, threshold levels, legislative and administrative preparations) is in process. A pilot study on the selection of an appropriate PRTR for Israel, in which about ten plants representing different industrial sectors, including the chemical sector, will participate, is scheduled for 2010. The system is expected to begin gradual operation in 2012.
- **Hazardous Materials Permit:** The Ministry of Environmental Protection utilizes the Hazardous Materials Permit as an important tool in the control and management of hazardous waste. The following information must be included

in table form in the application for the permit: type of hazardous waste generated and its main components, source of the waste, annual quantity of waste, method of waste treatment (transfer to the Ramat Hovav hazardous waste disposal and treatment site, recycling, recovery, reuse, etc.) and name of the transporting company in case the waste is transported outside the plant for treatment. The application must also include a declaration form on hazardous waste which must accompany the waste from its place of generation to the treatment site.

- **Information and Response Center for Hazardous Substances:** The Ministry of Environmental Protection's Information and Response Center compiles data on hazardous materials which are used, produced, imported, exported, transported, recovered and disposed of in Israel.

Establishment of combined treatment/disposal facilities for hazardous wastes in small- and medium-sized industries

Small and medium-sized industries comply with the same regulations as large industries. However, small and medium-sized industries may ship their chemical waste to transfer stations, in which the waste is collected for transport together with other companies' waste to Ramat Hovav. This helps cut the costs of shipping and handling.

Dissemination of scientific and technical information dealing with various health and environmental aspects of hazardous wastes

A National Center for Hazardous Substances and Environmental Studies, established by the Ministry of Environmental Protection, instructs and trains all emergency services, including police, fire fighting services, army units and medical services that deal with incidents involving hazardous substances. Subjects include integrated response procedures, risk assessment and hazardous substances legislation.

Safety at Work Regulations on Material Safety Data Sheets, promulgated in 1998, require producers, importers, distributors or sellers of a hazardous substance to supply recipients with Material Safety Data Sheets (MSDS). The regulations call for the maintenance of an MSDS in the factory or business in order to inform users about hazardous substances in their workplace.

Emergency procedures in plants in which hazardous materials are used and hazardous waste is generated include requirements for identification and assessment of safety, health and environmental hazards.

Notification systems and registries of exposed populations

The Ministry of Environmental Protection established an Information and Response Center for Hazardous Substances in 1993. The Center provides data and support on a 24-hour-a-day basis, including data on hazardous materials which are used, produced, imported, exported, transported, recovered and disposed of in Israel, and serves as a focal point of response and risk assessment during hazardous substances spills and accidents

Clear notification systems exist for emergencies involving hazardous waste.

Preventing illegal international traffic in hazardous wastes

Israel fully complies with the provisions of the Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal.

Environmentally sound management of solid (non-hazardous) wastes and sewage, in the context of integrated planning and management of land resources

Wastewater Management in Israel: An Overview

The combination of severe water shortage, contamination of water resources, densely populated urban areas and highly intensive irrigated agriculture, makes it essential for Israel to put wastewater treatment and reuse high on its list of national priorities. Out of a total of 500 million cubic meters of sewage produced in Israel in 2008, about 70% of the effluents were reclaimed. In recent years new or upgraded intensive treatment plants were set up in municipalities throughout the country. The ultimate objective is to treat 100% of Israel's wastewater to a level enabling unrestricted irrigation in accordance with soil sensitivity and without risk to soil and water sources.

Israel's intensive wastewater treatment plants, which use the activated sludge method, generate large quantities of sludge. The Ministry of Environmental Protection regards sludge as a valuable resource for fertilization and soil improvement, but only following appropriate treatment. In 2004, regulations on the use of sludge were promulgated which require wastewater treatment plants to stabilize and treat the sludge they generate as a condition for agricultural use or soil improvement.

In 2010, Israel's Knesset (parliament) approved Public Health Regulations (Effluent Quality Standards), 2010 which further Israel's treatment of wastewater. They include maximum levels for dissolved and suspended elements and compounds and for 37 different parameters in effluents for unrestricted irrigation and discharge to rivers

Introduction – Solid Waste

The problems associated with waste disposal and treatment in Israel are compounded by the country's unique conditions: a high rate of population growth – higher than other developed countries, rising standards of living and consumption patterns, accelerated building and industrial activity and one of the highest population densities in the developed world .

Due to land scarcity in Israel, the capacity of today's landfills will soon be exhausted. Moreover, landfills "consume" valuable land and are associated with both direct and indirect environmental and economic costs.

Local authorities in Israel are responsible for storage, collection and disposal of municipal solid waste, and municipal bylaws determine the legal and administrative arrangements for collection and disposal. Municipalities are authorized to establish sites for landfills and to determine other waste disposal and treatment locations in accordance with the Planning and Building Law and its regulations and the National Master Plan for Solid Waste Disposal. Disposal and treatment of solid waste require a business license and are subject to special conditions within the framework of the Licensing of Businesses Law.

The statutory tool for allocating sites for waste disposal and treatment, under the Planning and Building Law, 1965, is the National Outline Plan for Solid Waste. Siting

of landfills is based on environmental criteria (such as geohydrological conditions) and on planning criteria (such as distance from population centers and land use). Each proposed site is subject to environmental impact assessment.

Policies aimed at waste prevention and minimization, reuse and recycling

Several laws and regulations have been enacted in Israel in the field of recycling, including:

- **Collection and Disposal of Waste for Recycling Law, 1993**, which authorizes local authorities, and obliges them when required by the Ministry of Environmental Protection, to allocate sites for recycling centers and to install recycling facilities and containers.
- **Collection and Disposal of Waste for Recycling Regulations (Obligation of Waste Disposal for Recycling), 1998**, which requires local authorities to reduce their waste for disposal by means of recycling in accordance with graduated recycling targets.
- **Deposit Law on Beverage Containers, 1999**, which came into force in 2001 and requires manufacturers, importers and retailers to collect a deposit on beverage containers larger than 0.1 liters and smaller than 1.5 liters. A February 2010 amendment to the law imposes direct responsibility for collection on producers and importers, including the collection of larger beverage containers.
- **Landfill Levy Amendment to the Maintenance of Cleanliness Law, 2007**, which requires landfill operators to pay a levy for every ton of waste landfilled. The levy aims to internalize the full and real costs of waste treatment and disposal.
- **Tire Disposal and Recycling Law, 2007**, which aims to reduce environmental hazards caused by improper tire disposal while promoting waste recycling. The law sets graduated targets for the disposal and recycling of used tires, and is based on the principle of "extended producer responsibility."
- **Packaging Bill**, distributed for comment to government ministries in February 2010, which aims to minimize the environmental impact of packaging waste, while transforming the waste into a resource and preventing the waste and

pollution of land resources. The proposed law aims to regulate the treatment of packaging in Israel and is based on the principle of manufacturer responsibility.

In 2006, the main elements of the Environment Protection Ministry's integrated waste management policy were approved by the National Planning and Building Board, in the form of a Sustainable Solid Waste Management Master Plan until the year 2020. The plan presents a comprehensive framework for environmentally sound management of solid waste, including rules, criteria, approaches and long-term goals for achieving integrated solid waste management. It relates to all stages of solid waste management, to all generators of waste and to a wide range of treatment methods.

The master plan outlines the steps necessary to achieve the goals of solid waste management in Israel. Each step is made up of two components: actions that will serve as “agents of change” to achieve the long-term goals of the master plan, and regulative, economic and informational tools to facilitate the process.

In accordance with the recommendations of the master plan, Israel's statutory master plan for solid waste management is currently being amended. The goal is to facilitate and simplify planning for recycling and recovery facilities, offering different treatment options and based on environmental criteria.

Additional measures for minimization of disposal and increase in recycling include:

- Several private companies collect electronic waste for recycling.
- Neighborhood drop off centers have been established in many local authorities.
- The website of the Cleaner Production Center includes a waste material exchange bulletin board with two listings: supply and demand. Advertising on the exchange is free of charge.
- A green procurement initiative by government is helping to promote the use of recycled materials in all ministries and affiliated bodies. Environmental criteria are incorporated into the public procurement of several products and

services through the Governmental Purchasing Administration, including recycled paper and collection of waste paper and printers (including the requirement for two-sided copies).

- A government decision taken in December 2009, entitled "*Green Government – Operational Efficiency of Government Ministries*" aims at setting the Israeli government and its agencies as an example of sound environmental management, based on sustainable development principles. Government offices are expected to reduce resource consumption, reduce waste and increase the use of recycled materials
- Israel's only cement plant uses refuse derived fuel (RDF) as well as hazardous waste as a source of energy.
- Top priority is given to the collection, recycling and reuse of construction and demolition (C&D) waste: voluntary agreements with the Manufacturers Association and with the Contractors and Builders Association to promote recycling of C&D waste are in effect; active quarries are required to recycle C&D waste at a certain rate of the quantity of material extracted at the quarry; government bodies are required to include 20% use of recycled fill material in infrastructure projects; and at least 20% recycled C&D waste materials are to be used for large infrastructure projects and recycling on site

The website of the Ministry of Environmental Protection includes comprehensive information on solid waste disposal, treatment and recycling which is targeted at both professionals and the general public. The information includes: listings of companies and plants which collect and recycle waste, professional guidelines on waste treatment and on the establishment, operation and closure of landfills, and listings of authorized landfills and transfer stations for the disposal and treatment (including recycling) of solid waste, hazardous waste and C&D waste.

Development of environmentally sound disposal facilities, including technology to convert waste into energy, such as, for example, through utilization of landfill methane

Solid waste management has undergone major improvements since the early 1990s when 96% of Israel's municipal solid waste made its way to hundreds of illegal and

polluting disposal sites and transfer stations throughout the country. A 1993 government decision mandated the closure of the country's unregulated dumps and their replacement by state-of-the art regional and central landfills, with implementation completed in 2003. Today, most of the country's waste (nearly 80%) is disposed to 14 state-of-the art landfills, located in different regions of the country. All of the country's regulated landfills have installed systems for leachate collection and treatment and prevention of leachate leakage and most have installed, or will soon install, systems for the collection and treatment of gas emissions. Several landfills have begun to operate facilities for landfill gas extraction and energy recovery.

Within the framework of the Clean Development Mechanism, Israel's major landfills have applied to the National Designated Authority for approval of projects dealing with landfill gas treatment recovery, electricity production and methane reduction (http://www.sviva.gov.il/Enviroment/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Zone&enDispWho=Waste Projects_cdm&enZone=Waste Projects_cdm). For example, the Hiriya landfill project was the first in Israel to be registered by the Executive Board of the CDM (2006). A methane gas collection system was set up at the landfill and the gas collected is concentrated in a central transport pipeline and transferred to a flare for treatment. The biogas is being used as an energy source for a nearby industrial plant.

Financial mechanisms for waste management service development in deprived areas

Between 1994 and 2003, financial support was provided to local authorities in Israel for transporting their waste to regulated landfills following the closure of illegal dumps. In more recent years, financial support was given for recycling programs, including material recovery facilities, recycling centers, recycling infrastructure for C&D waste and educational programs on recycling

A 2007 amendment of the Maintenance of Cleanliness Law, 1984, introduced a landfill levy. The revenues from this levy, as well as from fines, are allocated entirely for recycling and recovery schemes by local authorities and entrepreneurs. In 2008 and 2009, the directorate of the Maintenance of Cleanliness fund published criteria for

financial assistance from landfill levy funds for separation at source, recycling and education and information projects.

Based on these criteria, recycling projects were approved for dozens of local authorities. Funds collected in 2007-2008 totaled about \$28 million, of which some \$10 million have already been returned to local authorities to help reduce recovery costs and promote recycling, composting, waste to energy and sustainable materials management. A multi-million dollar budget has been allocated by the Ministry of Environmental Protection for the promotion of technologies for waste management.

Radioactive wastes and their environmentally sound management (safe storage, transportation and disposal of radioactive waste)

The Hazardous Substances Regulations (Disposal of Radioactive Waste), 2002, set prohibitions, obligations and limitations on the disposal of different types of radioactive wastes – solid, liquid, sealed and unsealed. Radioactive waste must be disposed either to the national repository for radioactive waste or to municipal waste sites following specific steps to bring the wastes to a level that is permitted for safe disposal. Additional prohibitions or limitations are set on burning radioactive waste, disposing of animal carcasses containing radioactive waste, and disposing of liquid radioactive waste to the sewage system. Holders of radioactive waste are required to keep careful records on radioactive wastes and their manner of disposal.

The national radioactive waste disposal site handles all radioactive waste produced in Israel. The site is ISO 14001 certified and was planned according to international safety and operations principles. In recent years, as part of an overall policy to reduce the transportation of short life span radioactive waste, institutions such as hospitals and research facilities maintain safe rooms for the waste. The radioactive waste is safely stored and monitored up to the point that the waste is no longer active and can be disposed of using conventional methods.

THE TEN YEAR FRAMEWORK OF PROGRAMMES ON SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

Introduction

It is widely recognized today that the transition to more sustainable patterns of consumption and production is what sustainable development is all about. Although there is no formal national plan on sustainable consumption and production (SCP) in Israel, the subject is incorporated in both policies and legislation, especially in relation to integrated waste management, energy efficiency and water conservation and management. Moreover, the 2003 government decision on sustainable development has accelerated the development of a range of tools and policies including green procurement, green building, green government, eco-efficiency, eco-innovation and awareness-raising.

Generic issues relating to the inclusion of SCP in national policies

Inclusion of SCP in development planning

The 2003 government decision on sustainable development directly relates to the wise use of natural resources. *Inter alia*, the decision calls on the relevant government ministries to prepare strategic plans for sustainable development, which relate to such issues as energy conservation, renewable energy, water conservation, efficient use of raw materials, water, energy and land in the business sector, clean production practices, research and development of environmental technologies, green building, public transit, and sustainable development education.

The Ministry of Environmental Protection is currently in the process of formulating a national plan for sustainable consumption. This plan will direct present and future initiatives for development planning on sustainable consumption. The ministry is also in the process of mapping its programs and regulations on green growth and the private sector.

Inclusion in national and local development planning, including infrastructure investment

Planning Guidelines

Israel's planning system does not mandate SCP. However, many voluntary plans and standards exist, especially with regard to green building, which incorporate new designs and technologies for reduced resource consumption, such as energy, water, recycling etc. Following are some examples:

- In 2002, the Energy Conservation Department of the Ministry of National Infrastructure published specifications on Energy Conservation in Public Buildings. The specification relates, *inter alia*, to the building envelope and to lighting, air conditioning and heating systems.
- In 2007, the Ministry of Construction and Housing published guidelines on the planning of sustainable communities and neighborhoods, which relate to land, water, energy and environmental quality.
- In 2008, the district planning committee of Tel Aviv prepared a policy document on green building, which provides guidelines for sustainable planning as well as tools to planning agencies, planners and entrepreneurs for the integration of sustainable construction from the earliest stages of planning.
- In 2009, the Ministry of Environmental Protection published a condensed guidebook on the principles of green building, which relates to such aspects as planning, water savings, wastewater treatment, energy efficiency and conservation, lighting, use of alternative energy, material and resource conservation, waste recycling, eco-design and more.
- Guidelines and instructions on the integration of green building principles were incorporated in local master plans for municipalities, communities and regional councils in Israel. The master plan for a Kfar Saba neighborhood is an example of such a plan, with 1000 residential units currently under construction.

Sustainable Industrial Zone

This plan, initiated by the Ministry of Environmental Protection and the Ministry of Industry, Trade and Labor, aims at turning selected industrial zones into sustainable industrial zones. The plan proposes new zone planning and infrastructure changes that will influence the chain of production, including planning for integrated

environmental management, energy conservation, water consumption, solid waste, wastewater, recycling and material reuse. A pilot project has been budgeted.

Sustainable Transport

The Israeli government views railways as a central means of mass transport which is both efficient and environmentally prudent. In an effort to realize the potential inherent in the development of the rail system, both in terms of passengers and freight, the government decided to invest \$7 billion in a multi-year program to establish a rail connection between all major and medium-sized Israeli cities.

Sustainable Waste Management

A Solid Waste Management Master Plan was approved by the National Planning and Building Board in 2006. It presents a comprehensive framework for solid waste management, based on reduction at source, recovery and landfilling, as a last option. The goals of the master plan include sustainable management of land resources in Israel and protection of the environment. In another development, a landfill levy which requires landfill operators to pay a levy for every ton of waste landfilled came into force in July 2007. Funds are deposited in a dedicated account and are returned to local authorities or to the private sector for establishing recycling and recovery infrastructures.

Sustainable Energy

Several government decisions have addressed the issues of energy conservation and promotion of renewable energy, as follows:

- A 2002 government decision called for the introduction of renewable energy into the electricity sector, with the aim that at least 5% of electricity supply will be supplied from renewable sources by 2016. Within the framework of this decision, the Public Utilities Authority (Electricity) decided in 2004 to determine tariffs for the production of energy from renewable sources, which will take account of the costs of pollution emissions.
- A 2008 government decision on energy efficiency aims to bring about 20% savings in anticipated electricity consumption by 2020. Among the proposed measures: energy savings in the home and in government structures, green

building, higher energy efficiency standards for electrical appliances, information programs on wise use of electricity and establishment of an energy efficiency fund.

- In January 2009 the Israeli government approved a proposal on establishing targets and formulating tools for the promotion of renewable energy, especially in the Negev and Arava arid regions. The decision calls for generating 10% of Israel's electricity from renewable sources by 2020, with 5% by 2014, and for identifying and allocating lands in the Negev and Arava for the construction of power plants from renewable energies.
- The Ministry of Finance has published a tender based on Performance Contracting - shared savings – in which the winner of the bid will install energy saving devices in government buildings and will be responsible for maintenance for the first five years in return for a payment equivalent of 50% of the value of energy savings achieved per year. A minimum of 10% energy saving is required. Currently, seven public buildings (courts and ministry buildings) are included in the tender and it is expected that government and private hospitals will be included in the future.

Water Conservation

A “Transitional Master Plan for Water Sector Development in the Years 2002-2010” was prepared in 2002 which relates to policy, institutional and operational changes which are required to manage Israel's water sector more sustainably. Among the steps identified to close the gap between supply and demand are: water conservation and water saving projects, reclamation of large amounts of effluents to replace fresh water for agricultural irrigation, seawater and brackish water desalination and remediation of wells. Many of these goals have been backed up by government decisions and are currently being implemented.

Green public procurement policies, laws and regulations

Green Government

On December 13, 2009, the government approved a decision on "*Green Government – Operational Efficiency of Government Ministries*." The decision aims at setting the Israeli government as an example of sound environmental management that integrates

steps for sustainability in its activities. Additionally, the decision reflects the environmental commitment of the civil service and the government for efficient management and environmental responsibility.

The goals of the government decision are to:

- Conserve energy and resources.
- Promote thrifty financial allocations – doing more with the same allocated budget.
- Increase the demand for eco-friendly products to encourage the creation of an environmentally friendly product market.
- Support local initiatives for environmental management.
- Set an example for the practice of sustainable consumption.
- Increase legitimacy and public awareness of environmental regulation.

Government offices are expected to adopt the following aspects of green procurement and resource conservation:

- Reducing the consumption of resources.
- Reducing the amount of waste generated in the office.
- Increasing the use of recycled materials.

Green Procurement

A government decision on green procurement, titled Promotion of Goods and Corporations with an Environmental Standard in Public Procurement, was adopted in 2008. The decision calls on the Minister of Finance to authorize the Accountant General of the Treasury to formulate administrative instructions on promoting products and corporations with an environmental standard in contracts for land or products or purchase of services. As a result, environmental criteria are incorporated into the public procurement of several products and services through the Governmental Purchasing Administration, including, for example, recycled paper and collection of waste paper and printers (including the requirement for two-sided copies).

The decision to take account of the environmental impacts of products in government procurement is expected to advance the development of eco-technologies, to encourage environmentally friendly production by manufacturers and to increase public awareness.

Instruments for sustainable consumption

Awareness-rising programmes/campaigns on SCP, including water conservation, energy efficiency, waste minimization and recycling

Energy conservation and efficiency

The Ministry of National Infrastructure, in cooperation with the Israel Electric Corporation and the Ministry of Environmental Protection, coordinates an energy conservation campaign, which includes public service announcements in all media with tips on reducing household energy consumption, (e.g., setting lower air conditioners temperature, turning off lights, installing electric meters that can provide information on energy consumption). The ministry also promotes regulative policies that are aimed at reducing the energy consumption of households by, for instance, prohibiting the import of high energy consumption electric appliances.

Workshops on energy efficiency are organized for industry to demonstrate the considerable energy efficiency potential in different branches of industry and to highlight the advantages for companies that participate in the international carbon market.

Water conservation

In recent years, and in light of water scarcity in Israel, major water saving campaigns have been launched to increase awareness of the need for water conservation and to reduce consumption in all sectors.

- Israel's Water Authority conducts an annual campaign designated to reduce water consumption. The campaign utilizes all forms of the media – newspapers, radio, and television. It includes information on water saving devices such as double-volume toilet flushing basins and pressure regulators on taps and showers.

- Education on water efficiency and conservation is integrated into school curriculums. Additionally, the Water Authority conducts an annual national water awareness day for elementary school, junior high and high school children, in which all students undergo instruction dedicated to expanding knowledge and raising awareness of water conservation, especially in the home.
- The website of the Ministry of Environmental Protection features a set of green tips, targeted at the general public, on water conservation in both home http://www.sviva.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals^I2068&enZone=Water Conservation and garden http://www.sviva.gov.il/Enviroment/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals^I5862&enZone=Water Conservation.
- Information on advanced technologies for water-efficient irrigation is provided to farmers.
- Information on water thrifty plants is provided to the public on the websites of the Ministry of Environmental Protection, Water Authority, the Israel Water Company and others.

Recycling

In addition to legislative requirements under the Deposit Law for Beverage Containers, a voluntary scheme for the collection and recycling of large beverage containers is in operation in Israel. Some 127 million large beverage containers were voluntarily collected in 2008 by means of 8,000 collection bins in local authorities throughout Israel, constituting 18% of the total number of bottles in the market. The public is urged to discard empty containers in such bins via advertisements in the media.

In parallel, composting is a major activity, especially in light of the fact that nearly 40% of the weight of Israel's waste is made up of organic matter. Non-governmental organizations, local authorities, kibbutzim and schools actively participate in composting workshops and instructions. In addition, community gardens, which are

springing up throughout the country, often include a composting heap for nearby residents which helps transform kitchen waste and garden clippings into soil.

Non-governmental environmental organizations and the Ministry of Environmental Protection have invested major efforts in promoting the reuse and recycling of plastic bags. In addition to proposals for regulatory measures, retail chains have begun to sell reusable cloth bags to their customers, with satisfactory results. In June 2008, a public forum was organized by the Ministry of Environmental Protection in the Knesset (Israel's parliament), with the participation of all stakeholders, on the environmental impacts of plastic bags and on measures to reduce their use.

Green Building

Several measures have been implemented to increase awareness of green building among both professionals and the public. Courses on green building are offered to architecture and design students in the country's academic institutions, funds for research on green building are allocated, and seminars for architects, engineers and decision makers are conducted. In 2007, a green building competition was held, under the auspices of the Ministry of Environmental Protection.

Eco-Innovation

Several national and international conferences have been organized in Israel focusing on eco-innovation and energy efficiency:

- The Eilat-Eilat Renewable Energy International Conference which features what Israel has to offer in the area of renewable energy innovations (<http://eilatenergy.org/site/Default.aspx>).
- CleanTech - the International Summit and Exhibition for Renewable Energy and Water Technologies, Recycling and Environmental Quality, Infrastructure and Green Building which relates to such subjects as water technology, sewage purification, desalination, water betterment and recycling, sewage purification facilities etc.
- (<http://www.mashovgroup.net/cleanTechEnglish/tabid/99/Default.aspx>).

- WATEC Israel, the International Conference and International Water Technologies & Environmental Control Exhibition which presents a showcase of technologies, products and services to support a sustainable economy. During the most recent exhibition in 2009, the Ministry of Environmental Protection organized conferences on separation of waste at source and renewable energy. The Ministry of Environmental Protection's booth featured a model green house to allow participants to experience the environmental and economic benefits of sustainable building. (<http://watec-israel.com/index.php>).

Policies and/or infrastructure to support citizens' choices for responsible consumption of products and services, including consumer information tools

Eco-labels

Israeli standard 1728 on General Guidelines for the Assessment of Products with Reduced Environmental Impact (Green Products) was published by the Standards Institution of Israel (http://www.sii.org.il/385-en/SII_EN.aspx) in 1994.

The green label represents a holistic judgment, giving overall assessment of a product's environmental quality relative to other products in its category. It is granted when a product meets environmental criteria in such realms as waste reduction, energy savings, reduction of hazardous substances use, utilization of recycled materials, and reduction of packaging. Different categories of products are defined, with clear criteria for eligibility for each, including: electrical appliances, computers, toners, solar collectors, lubricants, paper and plastic products, fluorescents, paints and more.

The Ministry of Environmental Protection features an eco-label guide on its website. The guide includes information on the main labels and their social and environmental significance.

Sustainable Consumption Index

The Ministry of Industry, Trade and Labor is in the process of developing an index that will examine lifestyle progress for sustainability. The intention is to monitor changes in consumer behavior of households in Israel – reducing environmental

pollution and consumption of non-renewable energy. The index will reflect behavioral changes such as: the degree of recycling (organic materials, bottles, packaging, plastic bags, etc.), clothing, water use, consumption of organic food, recreational activities, etc.

Energy Labeling

The Standards Institution of Israel is responsible for developing labels and standards for residential electrical appliances. Both mandatory and voluntary labels have been introduced, with mandatory labels going into effect in the 1990s, when Israel enacted standards and labeling requirements for such products as air conditioners, refrigerators and freezers, water heaters, and several other household appliances.

The Guidebook for Sustainable Lifestyles

In August 2008, the Ministry of Environmental Protection published a comprehensive guidebook for sustainable lifestyles. The guidebook is designated to provide the public with information on wise consumption and to raise awareness of the possible outcomes of unsustainable consumerism. The information aims to enable individuals to wisely choose their consumption patterns and to understand possible effects on society and the environment. For example the guidebook for sustainable lifestyle covers issues of:

- What to buy – general factors to consider when buying a product (e.g., usefulness, environmental impact, product life cycle, quality, purchase of services rather than products, fair trade, etc.).
- Going shopping – choosing where to buy things (e.g., buying from small businesses, combining a few shopping trips into one, using the internet or phone to purchase some products, minimizing the use of plastic bags, etc.).
- Buying fruits and vegetables – buying tips (e.g., buying local produce, buying seasonal produce, buying loose fruits and vegetables, etc.).
- Detergents, paint and other hazardous substances – tips for alternative eco-friendly (homemade and bought) detergents.
- Office supplies and school equipment – ideas for consumption reduction and information on health hazards.
- House pets – information about endangered species, biodiversity, and pet care.

- Finance and investments – responsible investments and choosing socially responsible banks.

Curriculum development/formal education programmes

Professional education

All of the country's major universities and colleges have opened graduate or undergraduate level programs in environmental studies and management. In parallel, the Division for Professional Training of the Ministry of Industry, Trade and Labor plans to open three new educational curriculums in the coming academic year – Water Engineering, Wastewater Technician, and Renewable Energy Engineering. These curriculums are designed for young professionals that wish to expand or change their professional abilities. The studies will be conducted in a number of colleges across Israel, with the tuition subsidized by the Ministry of Industry, Trade and Labor. Furthermore, several of Israel's non-governmental organizations provide training and seminars on different aspects of SCP.

Education for sustainability

Education for sustainability, with an emphasis on sustainable consumption and production, ranks high on the priority list of both government and public organizations. Of special importance is the Green School accreditation program, under the auspices of the Ministry of Environmental Protection and the Ministry of Education, which has seen the certification of 232 Green Schools and 274 Green Kindergartens in Israel

Schools are approved for the green school process if they meet the following three criteria:

1. Integration of environmental subjects in the curriculum.
2. Rational use of resources, including reduction in electricity, water, and paper consumption and collection of waste for recycling.
3. Contribution to the community, including implementation of a community environmental project, such as increasing awareness of recycling and information on environmental subjects such as reduction of plastic bag use.

In addition, a "Green Campus" project is being implemented in Israel which sees the accreditation of institutes of higher education, in a process similar to the green school. The assimilation of green building as one of the components of the rational use of resources program is recommended.

Education and awareness

In Israel formal and informal education programs are continuously being developed by the Ministry of Environmental Protection, the Ministry of Education, community centers and non-governmental organizations. Targeted at all segments of the population, many of these programs deal with raising awareness for sustainable consumption by means of the three Rs – recycle, reuse and reduce:

- **Recycle:** recycling projects have ranked high among school activities, whether composting workshops (utilizing composting bins provided by the Ministry of Environmental Protection to participating schools), paper recycling competitions or used battery collection campaigns. In addition, students often collect and return used beverage containers and transfer the redeemed deposits to charities throughout the country.
- **Reuse:** plastic bag reuse is high on the agenda for school children. The plastic bags are turned into carpets, handbags, and ornamental statues. (http://www.sviva.gov.il/bin/en.jsp?enPage=BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals^12432&enZone=green_consumption_200)
- **Reduce consumption:** The Ministry of Environmental Protection published an activity book teaching children how to different kinds of daily products. The simple understanding of product cycle and the ability repeat it is considered to be an empowering and an awareness rising experience.

Educational initiatives by Israel's non-governmental organizations include:

- **Children Make a Difference:** This eco-education program of the Society for the Protection of Nature in Israel (an NGO) obliges participating schools to adopt environmental thinking and green management in cooperation with the community and the neighborhood. Program activities take place within both the formal and informal education systems and aim to increase the child's responsibility for his or her immediate environment, as a first step toward wider environmental responsibility.

- **Green Course – Students for the Environment:** Established in 1997, Green Course is the only nationwide student environmental organization in Israel. The organization produces and distributes materials on recycling, energy use, and decreased waste and encourages students to assimilate environmentally-friendly behavior.

SCP in national priority areas

Inclusion of SCP in policies, laws, regulations, and guidelines

Waste Management

To address the problem of ever-increasing quantities of solid waste, the Ministry of Environmental Protection has formulated a policy founded on integrated waste management. It calls for reduction of waste at source, reuse, recycling, energy recovery and landfilling. The goal is to reduce the total quantity of waste that the country generates, in general, and the quantity of waste which reaches landfills, in particular, and to increase waste recovery and recycling to 50% by 2015.

To promote waste recycling and reduce the quantity of waste destined for landfilling, the Ministry of Environmental Protection has introduced several laws and regulations in recent years, including the landfill levy, the Deposit on Beverage Containers Law and the Tire Recycling Law.

In February 2010, a new Memorandum on a Packaging Law was distributed, expanding the regulative span to include issues of sustainable production. The proposed law will impose personal responsibility on all manufacturers and importers in Israel (food, cleaning materials, electronic products, etc.) to collect and recycle the packaging waste of the products they market. The law aims to regulate the treatment of packaging in Israel, and is based on the principle of extended manufacturer responsibility, whereby the manufacturer or importer is responsible for the collection and recycling of the packaging they produce or import for sale in Israel. The law adopts the guidelines and targets of the European Directive on packaging and packaging waste.

Green Building

Israel Standard 5281 for buildings with reduced environmental impact (green buildings) was published by the Standards Institution of Israel in 2005. The standard

is currently voluntary and is awarded to new or renovated buildings that comply with specific requirements and criteria on energy, land use maximization, water conservation, wastewater and drainage and other environmental subjects, reuse of waste from demolished buildings, indoor air quality, and use of green label materials and products. The Ministry of Environmental Protection is helping to promote a mandatory building code in cooperation with the Ministry of Housing and Construction. This code will include regulations issued by the Ministry of Interior under the Planning and Building Law, 1965. Green building and energy efficiency will be important elements in the set of new building codes. To date, several buildings have been accredited as green buildings throughout Israel. Significantly, several universities have constructed green buildings or are in the process of doing so, including the Center for Desert Architecture and Urban Planning in Ben-Gurion University of the Negev, the Blaustein International Center for Desert Studies in the Institute for Desert Research, the Faculty of Civil Engineering in the Technion – Israel Institute of Technology, the Environmental Sciences building at the Weizmann Institute of Science, and in the near future, the Porter School of Environmental Studies at Tel Aviv University.

Energy Conservation and Efficiency

A standard on the energy rating of residential buildings (Israel Standard 5282 Part 1) was approved by the Standards Institution of Israel in 2005 and a standard on the energy rating of office buildings was approved in 2007 (Israel Standard 5282 Part 2). To comply with the energy chapter of Standard 5281, it is necessary to fulfill some of the requirements of Standard 5282, especially with regard to insulation and windows. The aim of the standards is to define the necessary conditions for make a building environmentally friendly in terms of its energy consumption.

The Energy Resources Law of 1989 aims to regulate the exploitation of energy sources, allocate them in accordance with the needs of various industries and use them efficiently and sparingly. Regulations within the framework of the law relate to the energy efficiency, energy rating and energy labels of a number of products, including air conditioners, refrigerators, electric heaters, solar water heating installations, thermal insulation, efficient consumption of energy, energy audits, inspections, etc.

Legal requirements for the installation of solar water heaters in new buildings and compliance with a standard which mandates thermal insulation levels that provide thermal comfort at reasonable energy consumption are in force in Israel. This accounts for 80% of all water heating requirements annually.

In January 2010, the Israeli Institute of Standards published a new standard for energy system management, ISO 50001. The standard is expected to save at least 10% of the energy consumption of organizations. It is expected that pilot programs in a number of companies will begin in 2010.

Water Management and Conservation

The Water Law of 1959 regulates the management of Israel's water resources, their preservation and their allocation for use. Pursuant to the law, all water resources in Israel are owned by the public and there are no private water rights or resources. The State, through the Governmental Authority for Water and Sewerage (the Water Authority) controls, manages and allocates the water resources as a trustee for the benefit of the inhabitants and for the development of the land. The Water Law allows wide-range and efficient instruments for sustainable water management system starting from water supply and demand strategies to wastewater management including treatment and reuse.

Effluent reclamation is an important source of additional water and Israel already holds a world record of 70% reclaimed effluents reuse in agriculture and is a world leader in the development and the production of efficient water saving irrigation systems. Upgraded effluent quality standards, which are appropriate for unrestricted irrigation and discharge to rivers, were approved by the Knesset (parliament) in 2010. These Public Health Regulations (Effluent Quality Standard) obligate both producers of wastewater and operators of wastewater treatment plants to treat their wastewater to the levels set in the regulations. The regulations allow for the reuse of effluents as a water source while at the same time improving public health and protecting the environment, including ecosystems and biodiversity.

ISO 14001 and 14004

ISO 14001 and 14004 standards (environmental management systems) were approved

by the Standards Institution of Israel in 2004. Dozens of companies and several municipalities have already been awarded certification.

Climate Change

A directors-general committee was established in 2009 to prepare a climate change policy for Israel and to formulate a national action plan on climate change mitigation and adaptation. Working groups have been set up on different subjects, including energy, transport, agriculture, planning and building and more.

A carbon cost curve for Israel, prepared by McKinsey & Company, demonstrated that technical abatement measures, such as introduction of renewable energy, improved fuel efficiency in cars, increased energy efficiency in buildings, use of efficient lighting and lighting control system, have a high potential for reducing greenhouse gases in Israel. The study also underlined the importance of behavioral changes, such as energy efficient lighting, public transportation, bicycle use, increased average building temperature and reduced meat consumption, in reducing emissions.

Inclusion of measures and policies to improve the environmental and social impacts of products (e.g. life-cycle analysis, energy-efficiency standards, internalization of environmental and social costs)

Measures and policies to improve the environmental and social impacts of products include the adoption of green building and energy rating standards for buildings and products. Life-cycle analysis is still in its infancy, but headway has been made in internalizing environmental and social costs in resource use. Thus, for example, the landfill levy specifically relates to the internalization of the environmental and social costs of landfilling.

Economic incentive measures for renewable energy have been developed by the Israel Public Utilities Authority – Electricity (PUA) for the sale of renewable energy to the Israel Electric Corporation and the related feed-in tariff and licensing arrangements for solar thermal generation. The renewable premiums reflect the cost of the avoided CO₂, NO_x, SO_x and particulate emissions due to the renewable generator's replacing fossil-fuel generators during each time-of-use period

In 2008, the government approved measures to encourage electricity production based on the installation of photo-voltaic cells on roofs by setting a higher tariff (about four times the going price of electricity for consumers) for electricity which would be sold to the national grid.

Furthermore, in January 2008, the Israeli government approved a proposal on the promotion of clean energy by means of green taxes, as per the recommendations of an interministerial committee on green taxes. The decision relates to taxes on private and commercial vehicles up to 3.5 tons, taxis, trucks and buses, fuel, congestion fees for all types of vehicles and renewable energies. As of 2010, purchase tax rates on vehicles in Israel are linked to the emission rates of five pollutants: carbon monoxide, hydrocarbons, nitrogen oxide, particulates and carbon dioxide.

Public, parastatal and private institutions involved

Governmental, public and private entities are involved in the promotion of SCP in Israel in the context of sustainable development, as follows:

- **The Israeli Association for the Initiative of a Sustainable Built Environment:** Founded in 2004, this non-profit organization is comprised of environmentalists, architects, engineers, entrepreneurs and companies which have adopted green technologies. Its aim is to promote public awareness and development of professional skills and practices in the field of green building, while making it accessible and available to all. It conducts seminars and workshops, assists companies and contractors in implementing the green building standard, trains green building facilitators, and publishes papers. The Association works in liaison with such international organizations as the IISBE (the International Initiative for a Sustainable Built Environment) and WGBC (World Green Building Council).
- **Israel Green Building Council:** Founded in 2007, this non-profit organization, is supported by industry, government and academy, together with professional, social and environmental organizations. The ILGBC aims to bring green building education to architects and builders in Israel, and to create a rating tool for real change in Israeli buildings. It expects to create a green design course for professionals to provide them with theoretical and

practical training in designing green building. A rating tool committee is working on research that will set the benchmarks for green buildings in Israel.

- **Program for sustainable consumption and production:** The Ministry of Environmental Protection coordinates a long term dialogue – "round table" – to promote discussion, activity cooperation and transparency on activities for sustainable consumption and production. The members of this 'round table' include the Ministry of Industry, Trade and Labor, the Manufacturers Association of Israel, the Federation of Israeli Chambers of Commerce, 'Maala' - Businesses for Social Responsibility, The Israel Union of Environmental Defense, NGOs and academia representatives. The goal of the 'round table' is to build a long term platform of cooperation.
- **Israel Small and Medium Enterprises Authority - Green Business:** Under the Ministry of Industry, Trade and Labor, the Israel Small and Medium Enterprises Authority manages Small Business Development Centers. The Green Business Center offers entrepreneurs and businesses:
 - Consultations, accompaniment and guidance (compliance with environmental regulation, cost effectiveness, technical solutions, etc).
 - Professional studies, including green entrepreneurship and green marketing.
 - Direct financing options and links to potential financial aid sources.
 - Reduction of environmental and economic costs.
- **Manufacturers Association of Israel:** The MAI is the sole representative body of all industrial sectors in Israel: private, public, kibbutz and government industries. Its Chemical, Pharmaceutical & Environmental Society is responsible for environmental issues and activities with the help of sub-committees on hazardous materials, air quality, sewage and environmental management. The society provides MAI members with ongoing updates on standards, legislation, innovation and environmental material and with consultation services related to the subjects of the subcommittees.
- **Cleaner Production Center:** Since July 2001, the Ministry of Environmental Protection and the Manufacturers Association of Israel run the Israel Cleaner Production Center in the headquarters of the Association in Tel Aviv. The objectives of the Cleaner Production Center include:

- Accumulating and disseminating information on cleaner production issues by means of seminars and a website.
- Enhancing awareness of the cleaner production process, its significance and its benefits, by providing assistance to cleaner production programs.
- Initiating projects incorporating cleaner production principles by local industry.

A high priority item on the Center's agenda is reduction of solid and hazardous waste at source and its recycling. This is undertaken by two means: a feasibility study of implementing clean production in industry, with the aid of experts and Good Housekeeping Practices.

The website of the Israel Cleaner Production Center features, among other things, a waste material exchange bulletin board. The board includes two listings: supply and demand. This free service allows companies to request the materials they require for their production or recycling processes (demand), on the one hand, or to offer waste materials which may be used as raw material by another plant (supply), on the other hand.

Also included on the Cleaner Production Center are guidebooks on good housekeeping practices in industrial plants and guidebooks on clean production in industrial sectors including print houses, metal plating plants, dairy factories, the textile industry, food processing, skin processing as well as pollution prevention case studies of plants in Israel which implemented clean production processes.

- **The Heschel Center for Environmental Leadership** and the **Center for Local Sustainability:** These organizations, in conjunction with other NGOs and the Ministry of Environmental Protection, are especially active in capacity building for sustainability by providing training, tools, and support networks for government officials, architects, planners and mayors. Projects initiated include the 20/20 initiative of major cities in Israel to reduce greenhouse gas emissions by 20% by the year 2020, the Zero Waste Initiative focusing on capacity building for community waste actions, the New Horizons project with a concentration on sustainable energy production and consumption, and the Good Energy Initiative, which aims to reduce greenhouse gas emissions through voluntary carbon offsetting.

- **Convention of the Forum 15 for Reducing Air Pollution and for Climate Protection:** Israel's major cities signed a convention in 2008 on the reduction of air pollution and the protection of climate. Following the preparation of a baseline emissions inventory and forecast based on energy consumption and waste generation, the municipalities are moving toward the development of action plans in four main areas: transportation and fuels, energy conservation and environmental friendly construction, garbage and recycling, and green spaces.
- **The Israel Lottery (Mifal Hapayis):** The Israel Lottery, a major financier of public buildings, including schools, has set up a committee of professionals and academics to prepare the criteria necessary for public green construction. These criteria will serve as the basis on which support and grants will be provided by the Israel Lottery for the construction of public green buildings.

Eco-efficiency/eco-design programmes

There is a wealth of design and architecture institutions in Israel. A majority of these institutions offer elements of eco-design in their educational program. In addition, workshops and seminars are provided by organizations such as the Manufacturer's Association.

Promotion of Corporate Social Responsibility in the sector

- **Israeli Standard SI 10000 for Social Responsibility:** In February 2007, the Standards Institution of Israel introduced a voluntary Israeli Standard known as SI 10000. This mark guides companies to reduce social inequalities and mainstream corporate social responsibility practices.
Additionally, the Standards Institution of Israel is drafting ISO 26000. This ISO aims to encourage voluntary commitment to social responsibility and will lead to common guidance on concepts, definitions and methods of evaluation standard in the area of social accountability.
- **Maala–Business for Social Responsibility:** Founded in 1998, Maala is a non-profit membership organization which serves as an advocate, consultant, educator and facilitator, encouraging corporations to identify opportunities for community involvement, promoting environmentally sound practices, social

accountability and reporting.

(<http://www.maala.org.il/Eng/Home/About/01/default.asp?ContentID=333>)

- **Government private sector relations:** In 1976 the OECD (Organization for Economic Co-operation and Development) published voluntary governance guidelines. The guidelines direct accountable governance in a wide variety of issues, such as: employment, relations with industry, environment, commerce, consumer rights and more. In order to monitor and assist the implementation, member states appointed focal points responsible for awareness rising and providing solutions to problems that may conflict with the proposed organizational conduct. In Israel, the Foreign Trade Administration at the Ministry of Industry, Trade and Labor is the national focal point. Twice a year a steering committee of the focal point meets, including representatives of the Ministry of Finance, Ministry of Foreign Affairs, Ministry of Justice, and Ministry of Environmental Protection. The committee works as a forum for discussions between the government and the private sector.

R&D incentive or support provided

- The Ministry of Industry, Trade and Labor has launched a national water and energy program – 'Israel NEWTech'. This program aims at providing funds for the development of water technology and renewable energy sectors in Israel. It continues Israel's accumulated experience with coping with water scarcity and developing renewable energy by spearheading new technologies of water management and energy efficiency which reduce consumption and environmental pollution.
(<http://www.israelnewtech.gov.il/Eng/Pages/IsraelNewTech.aspx>)
- During 2010, Israel is expected to take part in an OECD Household Behavior and Environmental Policy survey. The survey analyses the determinants of environmental behavior in five key areas where households exert pressure on the environment: energy use, transport, waste generation, food consumption and water use. The survey is anticipated to widen the scope of previous analysis by examining the effect of various types of environmental policy

instruments and by considering differences in environmental behavior among households (e.g. age, income, education).

- The Chief Scientist of the Ministry of Environmental Protection has published calls for research and a call for proposals to plants for consultation services for the feasibility review of reducing pollutants at source and increasing resource use efficiency. The support will be given for consultation services to the plant for possibilities of reducing pollutants in the following areas: industrial effluents, air emissions and reductions in the quantity or toxicity of hazardous substances. The review will include a review of alternatives for pollution reduction in the chosen area, including technological and economic technology feasibility of each of the alternatives.
- A 2008 government decision called for the promotion of research, technology development and energy production in the field of renewable energy. The goals of the new plan, slated for implementation in 2008-2012, are to increase renewable energy sales and increase research and development investments in the field. One proposal calls for establishing a research and development center for renewable energy technologies in the Negev.
- A study on Eco-Innovation in Industrial Firms was published by the Jerusalem Institute for Israel Studies in 2009. The study presents a model which describes the primary factors which influence industrial firms to undertake eco-innovation was constructed.

Links with spatial planning and sustainable city policies, including Integrated Waste Management

The planning system in Israel encourages sustainable consumption and production in two main categories:

- **Promoting cycling in the urban sphere:** The Ministry of Transport has drafted guidelines on the uniform planning of biking paths. The Ministry of Environmental Protection financially supports 20 projects for planning and 11 projects for implementation of bicycle trails.
- **Green building:** several communities and neighborhoods in Israel have been developed according to green building standards.

- **Sustainable transport:** Transport Today & Tomorrow, the Ministry of Environmental Protection and the Ministry of Transport have advanced a joint initiative aimed at encouraging a systematic sustainable approach to transportation planning from within local authorities. The initiative includes a sustainable transportation contest and a sustainable transport course.
- **Climate protection on the local level:** Israel's major cities, known as the Forum 15, signed a convention in 2008 on reducing air pollution and protecting climate. The municipalities have conducted a baseline emissions inventory and forecast, based on energy consumption and waste generation, which will be followed by the development of a local action plan describing the policies and measures that the local authority will take to reduce greenhouse gas emissions and air pollution in four main areas: transportation and fuels, energy conservation and environmentally friendly construction, waste and recycling and green spaces. Within each area, the municipalities will undertake specific initiatives such as planting roof gardens to reduce carbon dioxide, switching to cost-effective lighting in public buildings, recycling, and encouraging alternative transportation such as biking, walking, car-pooling and public transit.
- **Integrated waste management:** Several cities in Israel are implementing integrated waste management, which goes beyond requirements set in legislation, in terms of recycling centers, recycling infrastructures, and composting.