

ISRAEL - NATIONAL REPORT CSD-18

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 Quarry Rehabilitation Fund (http://mine-rec.mni.gov.il/index.php?tPath=1_2_95_123).

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 (about \$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 \$3.75 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.