

TOWARD WASTE RECOVERY

New initiatives and technologies may well herald a recycling revolution

The average Israeli generates 2.2 kilograms of municipal solid waste per year. Last year, some 4.5 million tons of solid waste (domestic, commercial and industrial) were produced in Israel, 12 million cubic meters in volume. The total quantity of solid waste in the country (including agricultural waste, sludge, contaminated land, building debris) has reached about 7 million tons per year. These numbers, however, are not static. Household waste has been increasing in the order of 4-5% annually. The reasons: population growth of nearly 2.5% annually (higher than any other developed country in the world), rising standards of living and unsustainable consumption patterns.

The situation is exacerbated by the scarcity of land resources. The capacity of current landfills, which are approved within the framework of the National Masterplan for Solid Waste Disposal, will be exhausted by 2003. The addition of two large sites, currently in planning, will allow for regulated landfill volume until 2008.

To address the problem, the Ministry of the Environment has formulated a policy founded on integrated waste management. It calls for reduction of waste at source, reuse, recycling (including composting), waste-to-energy technologies, and landfilling. The goal: to reduce the total quantity of waste that the country generates, in general, and the quantity reaching landfills, in particular. The target: to reach a 35%-40% recovery rate in 2005 and a 50% rate by 2010.

A Glimpse Back

In 1993, some 96% of Israel's municipal waste found its way to about 500 unregulated garbage dumps. Most were poorly managed and many had reached or were soon to reach capacity. The dumps were associated with a motley of environmental problems: risk of groundwater and soil contamination, stench, air pollution (including generation of greenhouse gases), aesthetic blight, threats to flight safety, consumption of expensive tracts of land. Recognition of the severity of the problems led to a government decision mandating closure of the country's unregulated dumps, their replacement by state-of-the-art regional and central landfills, financial aid to local authorities for transporting their wastes to a regulated landfill for a defined time period, and advancement of recycling and energy recovery.

In light of the 1993 decision, the Ministry of the Environment, in conjunction with the Ministry of the Interior, took action. It shut down or improved about half of the 500 illegal dumps, closed 74 out of the 77 large sites which received domestic waste on a daily basis (the other three – in Retamim, Modi'in and Rishon LeZion – are slated for closure within a year), and rehabilitated ten sites following closure according to strict environmental standards. Perhaps more than any action, the closure of the infamous 84-meter-high Hiriya landfill, adjacent to Ben-Gurion International Airport, marked the beginning of a new era – an era marked by integrated waste management.

Recent years have seen the establishment of state-of-the-art central landfills in Duda'im (northwest of Beersheba), Hagal (in northern Israel southwest of Lake

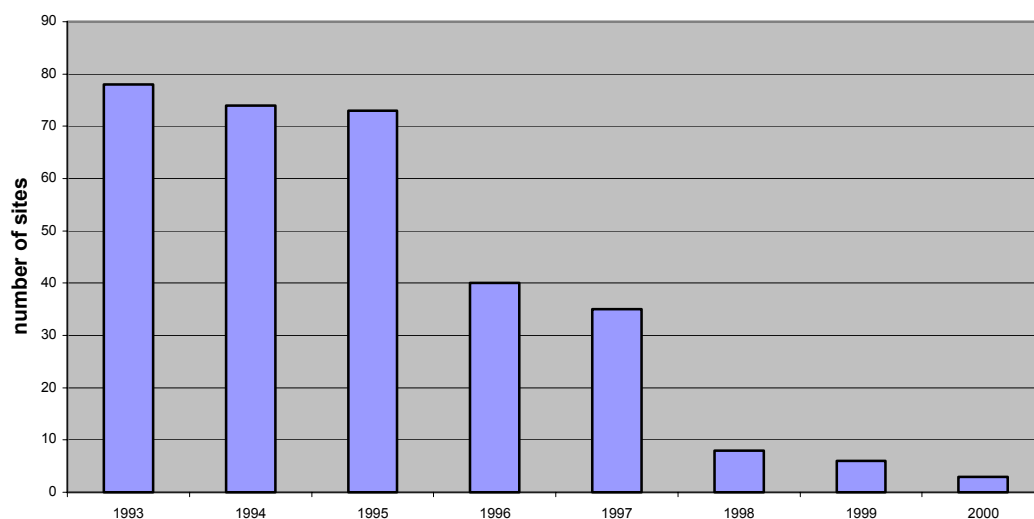
Kinneret) and Nimra (in the southernmost region near Eilat) – which receive some 4,500 tons of household waste per day. Other sites have been upgraded to comply with the requirements of the Ministry of the Environment, or are in the process of upgrading. An environmental impact assessment is being prepared for a new landfill – Efe in Mishor Rotem in the southern part of the country – with a potential capacity of 25 million tons. Financial support has been awarded to 107 local authorities – servicing about half of the population – for transporting waste to regulated sites following closure of dumps.

On the up side, most of the country's waste is currently concentrated in 15 state-of-the-art landfills. More than 80% of the waste is disposed or treated in an environmentally sound manner – in comparison to a mere 10% just a decade ago.

On the down side, progress in implementing the government decision has been slow due, for the most part, to citizen opposition and protracted legal battles based on the NIMBY (Not in My Back Yard) syndrome. As a result, the country is experiencing a deficit in approved and available landfill volume of over 3,500 tons per day – over a million tons per year. Demand for landfill space far exceeds availability.

To compound the problem, environmentalists are aware of the fact that landfilling, no matter how environmentally safe, is not a long-term answer. Landfills “consume” large expanses of valuable land and are associated with both direct and indirect environmental and economic costs. Therefore, the Ministry of the Environment has changed direction. Today, it is actively promoting alternatives to landfilling – source reduction, reuse, recycling, anaerobic fermentation, composting, curbside recycling programs, waste-to-energy plants. Every means will be utilized – financial support, legislation, education – to accelerate the move toward this new and more sustainable path.

Illegal Dumps in Use in Israel



Financial Tools

The cost of landfilling in Israel is low; it does not reflect the externalities associated with this disposal practice (air, groundwater and soil contamination, to name but a few), especially in a country characterized by scant land resources. Realistic pricing mechanisms are an imperative in order to promote alternative solutions to the country's solid waste problem.

As a first step, a decision was made to change the price structure of landfilling by means of a landfill fee. Last year, the Knesset approved this new fee within the framework of the Economic Arrangements Law (Legislative Amendments to Achieve Budgetary Objectives and Economic Policy for the 2000 Budget Year). The law called for the imposition of a landfill fee on the holder or manager of a waste disposal site. The rationale: to internalize the external costs of landfilling and to encourage alternative treatment methods. In accordance with this amendment, the Ministry of the Environment is preparing regulations for promulgation.

In parallel, the Ministry of the Environment has been providing financial aid to some 60 local authorities for recycling projects based on paper and cardboard collection, domestic composting, and plastic bottle collection. In 2000, voluntary collection of plastic beverage containers was initiated by a private recycling company (Aviv Recycling Industries) with financial aid from the Ministry of the Environment. Over 4,000 collection bins are already distributed in nearly 90 local authorities and the number may well double by next year. The initiative is not only decreasing the quantity of trash transported to landfills, but is raising environmental awareness and helping to produce new products – from garden furniture and park benches to PET flakes for the production of fruit and vegetable baskets.

Since a large portion of the country's waste (nearly 40% in weight) is made up of organic material, composting has been encouraged as a viable means of stabilizing and transforming solid organic wastes into safe and beneficial inputs in agriculture, horticulture and forestry. The Ministry of the Environment subsidizes half of the cost of backyard composting devices for gardening purposes. Dozens of community projects, many promoted by non-governmental organizations, have been initiated in this area.

Most of the country's agricultural organic waste is treated and used, whether as raw material through direct application, through composting or through pelletization as soil amendment fertilizer. The compost is used for agricultural and gardening purposes including fertilization, improvement of soil structure, canopy to prevent evaporation and runoff, and material for detached substrates. In addition, tens of thousands of tons of compost are recovered from the organic component of the waste transferred to two major recycling plants, servicing dozens of local authorities, in the north of Israel: the Afula plant of Amnir Industries and Environmental Services Ltd. and Western Galilee and Haifa Bay Compost Company Ltd.

The pace of financial support for recycling programs and for the establishment of recycling infrastructures has grown dramatically. The current rate of assistance stands

at NIS 25 for five years for each ton of waste which is not transferred to a landfill and is treated in an environmentally safe manner. Additional financial aid, at a rate of NIS 5 for five years for each ton which is recycled or recovered, is granted for establishing new recycling and recovery facilities.

Thus far, projects were approved which will see the recovery of some 300,000 tons of waste at a scope of NIS 37 million (for five years) in the Drom Yehuda Association of Towns, Kfar Saba and Hadera. Two of the facilities, in Hadera and Kfar Saba, will use an innovative technology developed in Israel by Arrow Ecology Ltd. The anaerobic digestion system does not require presorting, recovers recyclable materials such as metals, plastics and glass, and biologically transforms the organic fraction of the waste into biogas and stabilized compost.

With financial support for recycling projects and infrastructures, coupled by education and consciousness raising, it is hoped that recovery levels will reach some 17% by the end of 2001, more than 35% by 2005 and 50% by 2010.

Legislative Tools

In order to mandate an increase in the quantity of waste for recycling and reuse and a decrease in the quantity of waste for landfilling, the following legislation was enacted:

- The Collection and Disposal of Waste for Recycling Law was enacted in 1993 and regulations were promulgated in 1998 which set recycling targets according to the following timetable: 10% by 1998, 15% by 2000 and 25% by 2007.
- The Deposit Law on Beverage Containers was enacted in 1999, amended in 2000 and regulations were promulgated in 2001 which will set up a refund, bottle collection and recycling system. The law will come into effect in October 2001. The system should encompass over 910 million beverage containers, allowing for the reduction of about 8% of the volume and 4% of the weight of the country's solid waste.
- A packaging recycling bill is being completed designed to substantially reduce quantities of packaging waste.

Information and Education

Legislation and financial support will be accompanied by education and information to both local authorities and the general public. The Ministry of the Environment has begun to organize symposiums for mayors and senior officials of local authorities to demonstrate to them the economic benefits of recycling, to remind them of their obligations under the law, and to inform them of the financial aid which is now being provided for the promotion of recovery technologies.

At the same time, the ministry intends to educate and inform the general public about the importance of sustainable consumption patterns. New efforts will also be invested in promoting the eco-labeling system, known as the "Green Label." To date, some 70 ecolabels have been granted to different products which encourage use of environmentally friendly products.

The Results

Recycling rates have grown from 3% of municipal solid waste in the beginning of the 1990s to nearly 14% by the end of 2000 (21% with the addition of post-consumer industrial waste). Rates vary widely in different parts of the country – with the bulk of activity in the north of the country where two recycling plants are in operation (Amnir’s Afula plant and Western Galilee Compost in Haifa Bay with a 30% and 40% recycling rate, respectively). Recently, a new plant was inaugurated in Kalanswa in the center of the country. Similarly, to the existing plants in the north of the country, this plant will collect unsorted municipal waste for the purpose of separating dry components for recycling and transforming the organic fraction for composting. It is capable of handling some 500 tons of municipal solid waste per day.

The rise in recycling in recent years is attributed to the closure of old dumps, establishment of new sorting and recycling plants, advancement of recycling technologies for different raw materials, financial aid to local authorities, local and commercial initiatives and increased public awareness.

Estimates of Recycling: Israel 2000

Type	Total Recycled Municipal Solid Waste (tons/year)	Percent of Recycling out of MSW
Paper and Cardboard	180,000	4
Organic Material	70,000	1.6
Plastic	10,000	0.2
Glass	7,000	0.15
Ferrous Metal	250,000	5.5
Non-Ferrous Metal	40,000	0.8
Yard Waste	70,000	1.5
Electronic Equipment	3,000	0.05
Total	630,000	13.8

Out of a total of 4.5 million tons/year

Building Debris

The quantity of dry industrial waste and building debris in Israel has risen dramatically. To deal with the problem, designated sites for treating and disposing dry waste have been inaugurated, planning and building regulations have been amended which make permits conditional on environmentally sound disposal of the building debris, and enforcement has been stepped up. As a result, the quantity of building debris and dry industrial waste which reaches designated sites has increased from 300,000 tons/year to 1.5 million tons per year. Efforts are also focusing on the reuse and recycling of building debris by local authorities and contractors.

A Glimpse at the Future

Based on current trends, the quantity of municipal solid waste will reach 12 million tons in 2020, while the total quantity of waste will reach 18 million tons per year. At the same time, the organic fraction of the waste will diminish while the proportion of

paper, cardboard and plastic will grow. Landfill capacity will be exhausted. Alternative waste treatment will be imperative.

Thus far, the political will to implement the country's recycling goals has been weak. Few localities have implemented the requisite recycling programs for meeting the goals set in the recycling regulations. With the dawn of the new century, however, it has become increasingly clear that both carrot and stick will be necessary to move the country toward a sustainable path. Education and heightened awareness, financial assistance and realistic landfill prices, and not least of all, intensified enforcement of the regulations will be used to meet, and even to exceed, recycling targets.

The goal may well be within reach. In a recent development, the Ministerial Committee on the Environment decided to establish a waste incinerator in Haifa which will produce energy and further reduce the quantity of waste designated for landfills. The plant should become operational within five to ten years, pending the results of environmental impact assessments and other reviews. It is slated to receive up to 1,500 tons of solid waste per day or 450,000 tons per year.

In parallel, plans are proceeding for the establishment of additional sorting and recycling facilities. Thus, for example, a tender will shortly be issued for information on alternative waste treatment technologies for the solid waste of the Dan metropolitan area (including the city of Tel Aviv and surrounding municipalities).

But most important of all, Minister of the Environment Tzachi Hanegbi has placed waste recycling at the top of his agenda and is spearheading a campaign for obligatory recycling in all government agencies as part of a Greening Government initiative.

The Recycling Revolution may have arrived in Israel at last!

RECYCLING SUCCESS STORIES: ISRAEL 2000

Kiryat Tivon Local Council

Population: 12,700

Municipal solid waste: 40 tons/day

Recycling method: Voluntary separation at source into a wet and dry stream

Initiation of project: 1989

Citizen Response: Enthusiastic

Results: nearly 40% recycling rate and savings of NIS 400,000 per year.

Misgav Regional Council

Population: 14,500

Composition: 30 towns and villages including 6 kibbutzim and 2 Beduin villages, spanning an area of 200 square kilometers.

Municipal solid waste: 420 tons/month (300 domestic waste and 120 tons industrial waste)

Recycling method: Recycling and composting centers

Initiation: 1987 with full implementation beginning in 1996.

Citizen Response: Unsatisfactory initially but more active following a widescale education and information effort.

Results: 24% recycling rate and saving of NIS 150,000/year as a result of backyard composting devices which reduced the quantity of solid waste for collection and disposal by 500 tons/year.