

PRIVATIZATION OF THE WATER SECTOR – ISRAEL'S EXPERIENCE

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Abstract

The water sector in Israel is currently transforming from municipal and government owned utilities to privately operated utilities. This has been a slow process initially starting with privatizing wastewater treatment plants and continuing to several municipalities that have given concessions for their water and sewage networks. The majority of new desalination plants that are currently being constructed are again through BOT, BOO or Turnkey projects. As for Mekorot - National Water Company, the experience shows that it is not a viable target for privatization. Rational for this include: the need for a company that can act as the Supreme Water Authority during War or Emergencies for the entire country, a single company that can operate the complex national network that supplies water for the entire country at the required availability and at the highest standard of quality at uniform price.

1. Introduction

Israel is a young country that is still evolving. The state was declared in 1948 based on UN resolutions and has grown from a country with a population of 600,000 to a country with 6.8 million. The infrastructure was virtually nonexistent at the turn of the twentieth century while in the beginning of the twenty first century the infrastructure is on par of that of a developed country.

The State of Israel can be characterized as a lone island surrounded by other cultures (not all of them with diplomatic relations) and as such, the various infrastructures are not shared between these countries.

Though out the years of Israel's existence, large waves of Jewish immigrants arrived in Israel. These were usually not expected and caused a sudden increase in the population that loaded the infrastructure. Trying to forecast these sudden demographic changes was impossible and as a result the various country and regional master plans that dictated the required infrastructure were invalid. At times planning had to skip the master plan stage by directly going to the general design phase.

Israel is situated on the eastern shores of the Mediterranean Sea. It borders the desert strip and as a result the annual rain fall varies from 800 mm in the north to 25 mm in the south – see illustration number 1. The climate is Mediterranean – cold rainy winters (Nov – March) with hot dry summers (April – Oct). Since there are no major rivers flowing through Israel (the Jordan River itself is only several meters wide) historically no major cities were built as in other parts of the world (albeit small cities and towns flourished when ancient water systems were developed – e.g. Jerusalem). Through out the history of the region, water was the main obstacle for populating the land and as such the country was basically a rural that could sustain a very small population.

The overall strategy of founders of Israel – the Zionist Movement Leadership in the early twentieth century – was to establish a developed state that would attract Jews from all corners of the world. They saw three principle infrastructure components for advancing their aspirations –

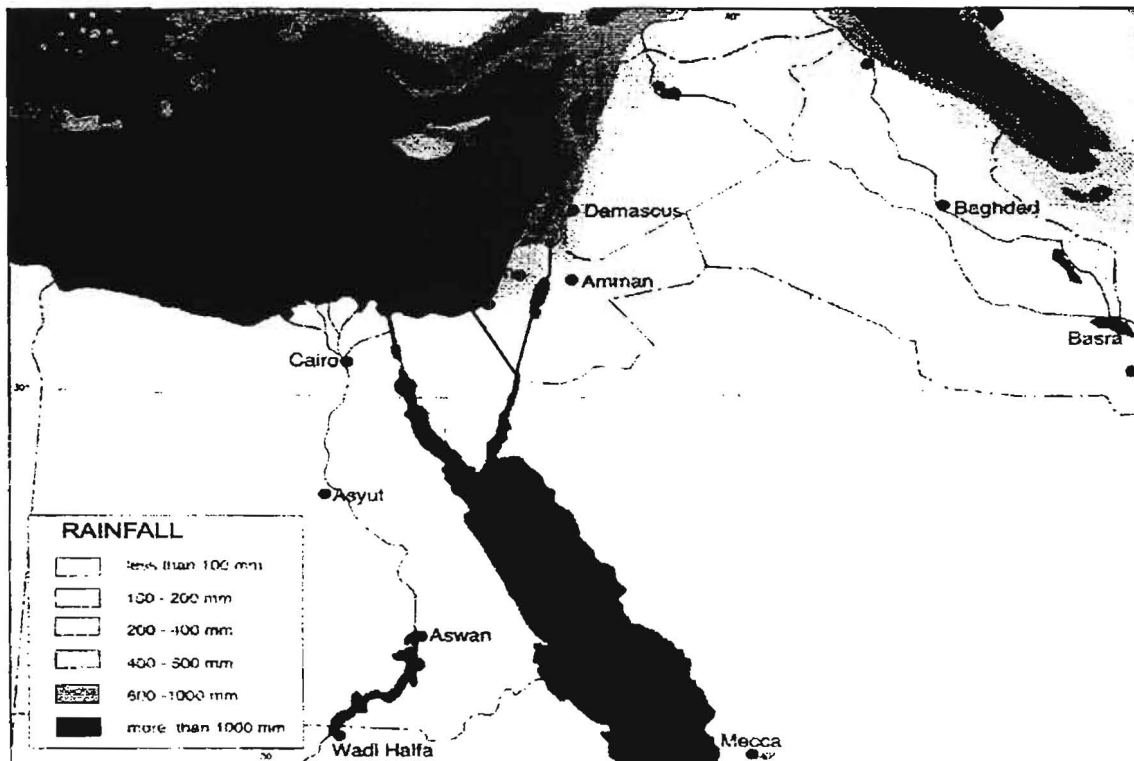


Illustration Number 1: Regional Rainfall Map

Water, Land, and Electricity. Since water was scarce through out the region, they saw water as the "potion of life" and as such, water was considered public property and an operational tool for building cities and farms and improving the living conditions of the general public.

In order to go from the ideology to practice, the leaders of the country established a national level of services that included water, health, defense, taxes, education and electricity. As a result of these goals, Mekorot – National Water Company was created in 1937 – eleven years before the creation of the state. The company mission was to supply water to all consumers and needs, at levels set by developed countries. In order to provide equality to all citizens, where ever they lived, an equal price would be set.

With the creation of Israel, massive waves of Jews arrived from around the world. Within 6 years, the population grew fivefold, from 600,000 to 3.0 million. During this period no foreign assistance was given. This period was a period of rationing and of general hardship, but yet during this period the National Water Carrier was built.

The National Water Carrier supplies water from the Sea of Galilee (at -212 meters below sea level) to the dry Southern Region via a 108" pipeline (see illustration number 2). The design of this system initiated decades before and was implemented with the establishment of Israel. This water system was essential for developing the country. During the fifties the main pipelines to the southern regions of the country were laid.

Three main water resources were developed in this period – Surface water from the Sea of Galilee, ground water from the Mountain and Coastal Aquifers. The amount of water from each

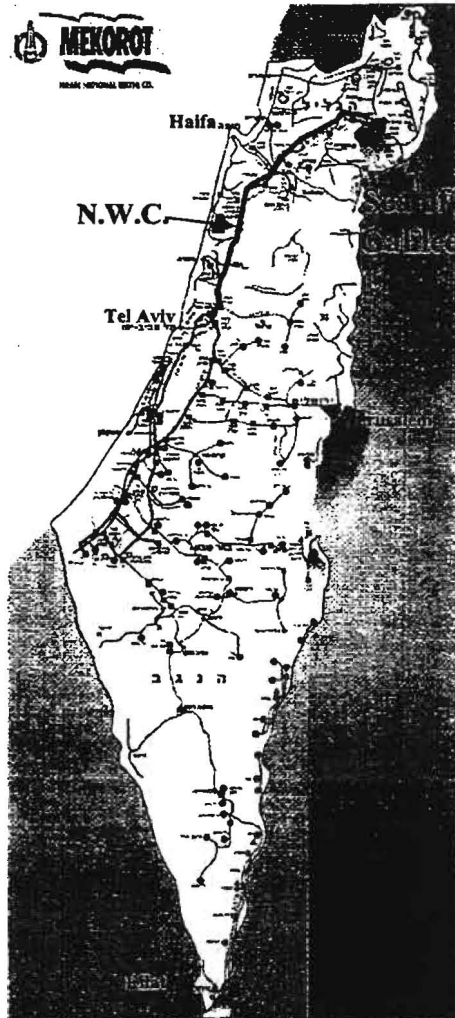


Illustration Number 2: National Water Supply Network – National Water Carrier (N.W.C.) is emphasized.

source is approved by the Water Commissioner and is pumped into the National Water Network. Each water source has a typical water quality. Managing multi quality water resources is complex; therefore it required setting up a central coordination and management office at the Mekorot - National Water Company.

This in turn allowed for settling the land and establishing new cities and farms. Mekorot was the operational wing that allowed for settling the land. Without such a company like Mekorot, only large metropolitans would have developed, since sparsely inhabited locations, in or bordering the desert, would not have developed.

Israel's leaders saw that in order to create a developed country it needed to provide water at a quantity and quality at developed country levels. In order to supply the water, that was a scarce commodity which required allocating equally for all purposes, the Water Commissioner's Office was created and given authority though the 1959 Water Law. The objective of this government function is to control and manage water resources and water supply both for Mekorot and private water associations. In addition the legislators faced with daily possible emergencies appointed Mekorot to be the Supreme Water Authority during Emergencies for the entire country. This was to enable to provide water during various crises that arose.

Table number 1 compares the specific water consumption of Israel, its neighbors and several Developed Nations. It can be seen that the there is a correlation between the GNP per capita and water consumption. The higher the GNP per capita the water consumption increases.

Table 1: Water Consumption versus GNP per capita of Israel, countries that border Israel and Developed Countries (World Bank, 2000)

Number	Country	GNP per capita [US\$/capita]	Amount of water available [m ³ /capita/year]	Annual amount of water supplied per capita [m ³ /capita/year]
1	Israel	16,710	449	100
2	Jordan	1,710	143	50
3	Egypt	1,490	1,071	50
4	Syria	940	2,761	60
5	Lebanon	4,010	1,109	40
6	USA	34,100	8,801	250
7	France	24,090	2,443	200

Therefore a developed country must provide constant development of the water sector. By keeping the water price uniform through out the country, farmers could be convinced to grow crops in outlying areas, thereby providing green areas, self sustenance and diversifying the population.

Present and future water requirements for the State of Israel are illustrated in table number 2.

Since the amount of water available is limited and it is completely exploited, as the population grows the amount of potable water available for agricultural purposes diminishes. In view of the fact that the population is steadily increasing new sources are currently being developed – large scale seawater and brackish water desalination, importing water from Turkey and tertiary wastewater treatment.

During the eighties and nineties large scale wastewater reuse projects were constructed so that effluent could convert potable water used for irrigation to the Municipal Sector. The government encouraged this process by providing loans and grants to the extent of 250 million US\$ to the Municipalities. During this period the government started to provide laws that require Municipalities to create a closed financial market for water services supplied (this last year this law has been enforced).

Table 2: Past, Present and Forecasted Water Consumptions (Israel Water Commissioner, 2002)

Number	Consumer	1990 water consumption [million m ³]	2000 water consumption [million m ³]	2020 water consumption [million m ³]
	<i>Population[millions]</i>	4.8	6.4	8.6
1	Municipal	500	707	1,120
2	Agricultural	1,236	1,021	1,150
3	Industrial	114	118	210
4	Total	1,850	1,846	2,480

It was common practice for Municipalities to buy water at low prices from the Mekorot and resale it to consumers at higher rates so as to allow for financing non water related activities that the Municipality needed at that time.

During the nineties the water sector in Israel has been involved on two main missions - developing infrastructure for the adsorption of 1.0 million new immigrants (mainly from the former Soviet Union) and upgrading existing wastewater treatment plants from systems based on natural treatment processes (facultative and oxidation ponds) to mechanical biological processes (activated sludge systems). The provision of these plants was mainly through various concession contracts (BOT, BOO and Turnkey projects with operational services provided). This was seen as a real start for privatizing the municipal water sector.

Currently Israel is faced with a severe drought. Large scale desalination plants are currently being constructed throughout the country and will be able to supply about 25 percent of the water in the coming years. Again a majority of these plants are provided through BOT initiatives thereby privatizing the water sector. Mekorot will also build a 45 m.c.m./year desalination plant as a turnkey project.

Anticipated future missions will include further enhancing the water quality that has deteriorated over the years as a result of population growth in the country, water source protection, providing water for protecting land against urban and rural sprawl and greening the land.

During all these periods of vast development Mekorot – National Water Company played a crucial role. Mekorot built the National Water Carrier and the most of the regional water systems, it actively participated in building the cities by providing water and it developed the first desalination plants in the country (for the city of Eilat). Today Mekorot supplies about 65 percent of the water supplied to Israel (about 1,300 – 1,500 million cubic meters annually). It basically is a water wholesaler supplying the water to the municipalities and farms at a uniform price that was determined by the Water Sub-Committee for the Israeli Parliament. The municipalities and villages are responsible for supplying the water to the consumers. Table number 3 presented facts and figures on Mekorot.

Table 3: Mekorot – the National Water Company - Facts and Figures 2001

No.	General Parameters	Unit	Value
1	Annual Water Supply	m.c.m.	1,278
2	Peak Daily Water Supply	m.c.m.	5.3
3	Annual Aquifer Recharge	m.c.m.	16.5
4	Annual Energy Consumption	billion KW	1.66
5	Consumers	Number	4,225
6	Annual Turnover	million US\$	600
7	Development Activities	million US\$	115
8	Research and Development	million US\$	3.0
9	Employees	Number	2,176
10	Total Length of Pipelines	Km	11,900
11	Pumping Stations	Number	791
12	Wells	Number	1,226
13	Operational Reservoirs	Number	70 with a total of 100.5 m.c.m.
14	Tanks	Number	750 with a total of 4.07 m.c.m.
15	Desalination Plants	Number	46
16	Central Control Rooms	Number	8
17	National Direction Center	Number	1

2. Privatizing the Water Sector in Israel

2.1 General

Privatization of the water sector - the Municipalities water and sewage departments and Mekorot – the National Water Company has been issue that has been brought up over the years in step with the global trend that private ownership is preferable to government operated services.

A number of different arguments suggest that, in the water sector, the regulation of privately owned and managed monopolies would increase economic efficiency (T. Lee – 1997). Among these arguments include:

- a. Reduced political interference
- b. Changing property rights
- c. Regulatory capture

Again when discussing privatizing the water sector there are several ways in doing so these include:

- a. Unregulated private ownership
- b. Regulated private ownership
- c. Concessions
- d. Leasing
- e. Management and service contracts

Of the above mentioned, unregulated private ownership would not be appropriate because of the limited amount of water that can be supplied in Israel, while service and management contracts are a more expensive alternative that suit transitional periods rather than a long term contract. Therefore the two most effective means that have been evaluated and implemented in several municipalities has been by concessions or regulated private ownerships.

Local municipalities and regional water systems that have a viable water source near the consumers can be profitable and some of the small ones have been privatized as a prototype. In addition several water networks in small municipalities have been given concessions. A majority of the waste water treatment plants have been awarded to private companies through various combinations of concessions – BOT, managerial services, co partnership between municipalities and Mekorot.

The question arises should the National Water Company follow suit and be also privatized?

The following discussion highlights the expected advantages of privatization of the National Water Company while experience shows that in Israel there are drawbacks that do not make it a feasible alternative.

2.2 Reduced Political Interference

Political interference has plagued many governmental companies through out the world. Sadly many good companies run amuck because government policy makers want to benefit from either nominating their political cronies or deciding on projects that enhance their personal wealth and not that of their country.

Mekorot has been seen in the eyes of the various political parties as a strategic asset for furthering the aspirations of the country and consequently it was not politicized. To date the only nominations in the company that have been politically chosen were the General Manager and the Chairman of the Board. These have been given to qualified managers (former elite generals of the Israeli Army, managers from the private sector etc.) that have had vast experience in managing large scale organizations. Past experience has shown that the managers have not been changed when new administration comes into office, but rather after a natural termination of their tenure (the present General Manager has served under three different administrations). Not only has the water company been considered to be a prestigious company, it's founders became Israel's Third Prime Minister and Finance Minister in the sixties – Mr. Levi Eshkol and Mr. Pinhas Sapir.

In the last few years, the Israeli parliament has required all nominations to key positions in governmental companies to be approved by a non-political committee headed by a former supreme judge. In addition several grass root organizations have put pressure on the various administrations to nominate for key positions only qualified personnel. This has enhanced the quality of managers put in key roles by the government and provided good checks and balances. In the latest reports Israel is ranked highly for non corrupt governments after the USA and Germany (The Economist, Aug - 2002).

In conclusion, privatization based on the rational that this would clean up political interference in Mekorot – National Water Company is not a strong case.

2.3 Changing Property Rights

Privatization has been seen as an effective way of providing incentives to the Water Sector. It has also been used to consolidate water and sewage departments so as to create a more effective professional force (for example: instead of having five mediocre engineers trying to solve similar problems in five wastewater treatment plants one highly trained professional is required). Again privatizing local municipality water systems has provided incentives to that area. Yet when looking at the national level, water is a scarce commodity (in an isolated "island") and has been a main issue in developing the country. The water supply system that has been created is a vast network of regional water systems that are joined together so that water can be transferred from one region to the next. This system provides a reliable water source for the entire country by connecting hundreds of wells from several different aquifers together with surface water and in the near future to desalinated water. Such a system requires central coordination for managing the water resources so as to obtain the amount of water and required qualities to the consumers. Without looking at the entire picture, synchronizing the system would be extremely difficult if not impossible. Therefore in any privatization scheme the main water network would have to stay intact. Smaller peripheral systems could be and are privatized. Since the infrastructure of the national network is in place, selling the company would transfer the network from a government monopoly to a private monopoly while not enhancing competition. Thereby the objective of privatization is missed.

In comparison, in the larger European Countries (e.g. England and France), where privatization of the water sector has taken place, competition is possible between companies by creating several concessions. Israel on the other hand has only one central network (that would be

considered in other countries as only a regional network) therefore the motivation for other large companies to compete is extremely low. A company that is awarded operation of the national network, in actuality, knows that it will be non-replaceable since no real competitor is available.

Since the government agencies saw that true privatization is not possible the government has implemented plans to create regulations that provide the stimulus to excel. These include the following:

- a. The price of water has been determined and all new investments, operational costs etc must be paid for through the price of water.
- b. The government has required Mekorot to tender out almost all construction projects to the private sector. Mekorot has transferred some of the construction activities managerial activities. Self capability construction is routinely preformed by the company in order to retain Mekorot's capabilities during emergencies as the Supreme Water Authority.
- c. Bonus pay is given to those employees that have performed well over the year.

Since initiating these measures – the subsidy Mekorot has been given has fallen from 650 million NIS to 200 million NIS annually.

The company also has over the years has implemented very strict application acceptance tests. These include psychological tests and interviews with a 2 – 3 year trial period. These barriers have allowed for providing a highly motivated group of employees that believe that their job is not only a place to work but is their duty. Working an 18 hour day so as to ensure proper water

supply is not uncommon (although not encouraged) but stems from the feeling of responsibility and mission that the employees have. These highly regarded traits have been a tradition with the Mekorot employees.

To ensure that this joint responsibility is enhanced, the company has always had a record of providing high salaries to its employees.

In addition, the company allocates money for technical courses for employees at all levels – from the manual laborer to upper management. Non-skilled veteran employees that show a high potential have been sent to colleges, while graduates are given the opportunity to obtain higher education and degrees. These incentives have proven effective in obtaining the most talented in the field.

Incentives are not just for private companies but government companies are capable of offering similar incentives that motivate employees and management to provide an inexpensive service to the public.

2.4 Regulatory Capture

When a government company is controlled by another agency the possibility of conflict of interests arises. When utilities are in the state sector, they have a comparative advantage in capturing the regulatory framework, e.g. they are able to acquire regulation which benefits them. As a result, their managers face little market competition and lack incentives to operate efficiently.

Trying to tip the scales for a more positive regulatory laws may be theoretically possible, is in reality problematic in Israel for the following reasons:

- a. Laws that seem unfair go to courts fairly rapidly by those who feel that they are unfair. Israel has 1 lawyer per 300 people the highest in the world- (Israel Bar Association - 2002). Again since there are many grass root organizations that focus on unfair laws, court cases would soon follow if the proposed law seems unfair.
- b. Consumers that feel that the water company has caused damage to them sue the company almost immediately. This in turn has caused Mekorot to adopt laws and regulations that are stricter than those required so as to enable a strong court defense. This has caused Mekorot to install automated operation with SCADA (Supervisory Control and Data Acquisition) systems, central operation control centers and a vast network of water quality online monitoring systems.
- c. There are several regulatory agencies that govern Mekorot's operation (Water Commissioner, Ministry of Health, Ministry of Environment, Ministry of Interior, Ministry of Treasury, Ministry of National Infrastructure, and Prime Ministers Office- by way of the Government Companies Authority). In each regulatory agency various departments regulate different aspects. This diversity does not allow for getting into cahoots with the government but rather usually creates very strict laws since the lowest common denominator determines the law. Since Mekorot is seen as a well paid company, it is not seen as an underdog to be assisted but rather a firm that must be constantly

regulated. As such bid by a high performance standard. This standard is in all areas – design, construction, operation and maintenance.

In addition the government has set rules that outline Mekorot's responsibility – a wholesaler of water to the various municipalities and farms. Commercial activities are in a separate company where financial independence is a must by agreement with the government.

In order to control upper management, management tools were developed that duplicate the operation of a private company. These include developing a suitable financial system, changing the behavior of the middle management and employees through workshops, creating independent "profit activity centers".

3. Discussion

Privatizing the water sector in Israel in general is advancing albeit slowly. This trend is in step with what is being done through out the world. Since water is a strategic asset in Israel a sudden change would be analogous to "throwing the baby out with the wash water". Municipal water systems and wastewater treatment plants are being the first to be privatized. On the other hand privatizing Mekorot - National Water Company with it's national water supply network would not have any advantages as outlined in the previous chapter. On the contrary, privatizing the company would have severe implications as follows:

3.1 Water Supply in Times of War

Israel unfortunately has been in the midst of a conflict for the last 50 years. As a result, water security is a daily concern that must be addressed. Mekorot is the Supreme National Water Authority during times of war. This includes being responsible for preparing the municipalities and home front for emergencies – procedures technical support and supervision and equipment procurement. During crisis this includes managing the water sector throughout the country. Some of the Mekorot employees are enlisted in the military reserves for this purpose. This responsibility cannot be delegated to a privately owned company since armies are not privately owned and no one is not considering such an option (both in the past and in the future). Again only a company that supplies water to a majority of the country would be capable of providing services to the population during emergencies therefore partial privatization would not be wise.

3.2 Future Development

Israel is still a young country. There are still many things that have to be developed. These include improving water quality, creating new water resources for an ever increasing population and protecting the national land from non authorized exploitation (the government owns 95 percent of the land – and barren land that is not irrigated is easily taken advantage of). The water infrastructure master plan of Israel for the next decade calls for 17 billion NIS (4.0 billion US\$). Each of these requires the state - which has the capacity to address the social costs and reap the social benefits in other areas - to make calculations about the wider economic cost/benefit analysis associated with infrastructure, (whereas private sector suppliers tend to rely upon only narrow financial cost/benefit analysis).

3.3 Social Equality

Water is an essential commodity therefore a uniform price to be paid for all the consumers in a society that cares for the individual is crucial. Water costs for areas where water is not readily available would not allow diversifying the population but rather would concentrate the inhabitation to several specific areas in the center of the country. In addition underdeveloped barren regions that have been over grazed throughout the centuries would not be utilized for agricultural crops. By having a uniform price for water the government has encouraged greening the land. Only a single company with a whole range of water costs can actuality implement a uniform water price. Trying to implement a uniform price for the entire country through several private companies would require endless bureaucracy and heated arguments over the required amount of money that is required to be transferred from one company to the next so as to balance the price between the consumers. Such a system was put in place by the Water Commissioner in Israel so that private water companies that supplied water inexpensively would pay money to the government in order to balance the unit price cost – "Balance Fund". This artificial balancing act created a non-transparent actual cost for water. Private companies were wary on providing the actual cost since this would entail additional monies that would have to be paid out. Mekorot on the other hand is required by law to be fully transparent though the annual financial reports. This "Balance Fund" was finally dropped since it was in actuality non effective. Providing a situation where the balancing act is internally maintained will allow obtaining a uniform price efficiently.

3.4 Water Shortages

As mentioned above, Israel is adjacently situated along the desert. Droughts are common and a fluctuating water supply is common. During the last few years the amount of water supplied by Mekorot has dropped from 1,500 million cubic meters annually to about 1,300 million cubic

meters annually. This of course is without compensation from the government. No private company would allow this without compensation. This reduction was dictated by the Water Commissioner that reduced the water allocations in the Agriculture sector.

4. Summary

The government of Israel's policy in general is to privatize the water sector. It has initially done so by providing BOT, BOO and Operational and Maintenance Services for wastewater plants. This has continued in several Municipalities to include water networks and wastewater collection systems. Currently desalination plants that are constructed are basically provided by the private sector. This trend of privatizing the water sources coming from seawater desalination and wastewater treatment plants will continue during the years to come yet government policy is to keep Mekorot as a government company. Mekorot will be managed with advanced managerial methods used in the private sector while obligated to continually becoming more efficient.

Water is a strategic asset in the country that without it, the country would not exist. It is vital that the national network stay in one central company that can operate the system effectively taking into account the various water qualities and quantities produced and supplying them to the consumers without complaints and in accordance with the Water Commissioners Allocations. During emergency situations Mekorot acts as the Supreme Water Authority providing services to the entire country. This task is crucial and cannot be delegated to a private sector.

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Curriculum Vita

Name: Sion Cohen
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EDUCATION:

1994 Business Entrepreneurship – Israel's Center for Management – one year

1989 Project Management – Sivan School for Computer Sciences - one year

1988 Senior Business Administration - Hebrew University - Israel.

1987 Management and System Analysis for Managers – Sivan School for Computer Sciences - one year

1985 Water System Analysis – Technion – Faculty of Civil Engineering - one year

1980 Electrical Engineering (B.Sc.) - Tel Aviv University - Israel.

PROFESSIONAL EXPERIENCE:

August 2000 – Present: Engineering Vice President - Mekorot – National Water Company

Areas of Activity and Responsibility

Directing water policy management, design and implementing conventional water systems (pumping stations, pipelines and reservoirs) and non conventional water systems (desalination plants, effluent reuse systems, rain enhancement, flood water utilization and marginal waters).

Preparing annual and long-term development plans with an annual budget of 200 million US\$.

Directing operational policies of water supply, water resource use, water transfer between areas and water quality issues.

Directing the maintenance policy of the company's various water systems with a annual budget of 40 million US\$.
Directing the companies research and development endeavors with an annual budget of 2.5 million US\$.

Representing the firm with other public agencies.

1997 - 2000

- Water Import Project Manager
- Chairman of the Ashkelon Waste Water Treatment Plant.
- Chairman of the "bug 2000" preparedness task force
- Project Manager for implementing SCADA systems for the Southern District – Mekorot Water Company
- A member of steering committee for constructing the Sabha desalination plant in Eilat
- A member of the steering committee for the constructing the desalination plant in Neveh Zohar.

1994 - 2000: Manager - Maintenance Engineering Department (M.E.D.)
Mekorot National Water Company - Southern District Israel.

KEY PROJECTS:

- Management of the erection of Central Control Rooms, utilizing SCADA technology for the districts Sderot, Beer Sheva and Eilat. Project value - 10.0 M\$.
- Management of the construction and operation of the Ashkelon Waste Water Treatment Plant. Project value - 18.0 M\$.

1989 - 1994: Manager - Field Installation and Plant Erection Division,
E.M.S. - a subsidiary of the Mekorot National Water Company.

KEY PROJECTS:

- Managing the erection of the Control Center for the Water Works for the City of Jerusalem. Project value - 0.7 M\$.
- Managing the erection of the pumping stations along the fourth water line to Jerusalem. Project value - 6.0 M\$.

- Managing the erection of the filtration plant for the city of Netivot. Project value - 0.8 M\$.

1986 - 1989: Manager - Computer and Information Center - Mekorot National Water Company - Southern District.

KEY PROJECTS:

- Managing the erection of the engineering computer system for Mekorot National Water Company Southern District.
- Erection, Management and Operation of the preventive maintenance program for the water installations throughout the Southern District.
- Preparation of specifications for preventive maintenance for 17 engineering disciplines.

1981 - 1986: Senior Electrical Engineer - Mekorot National Water Company - Southern District.

KEY PROJECTS:

- Designing of the electrical works for the desalination plant in Eilat.
- Design and supervision of electrical installations in water works - Southern District.

Registration and Memberships

Member on the board of directors for EMS – a subsidiary of the Mekorot Water Company with an annual revenue of 50 million US\$.

Association of Engineers and Architects in Israel.

Union of Graduate Engineers in Israel.

The Israel Management Center.

Member on the Israeli Water Board

Languages

English, Hebrew, French.

