
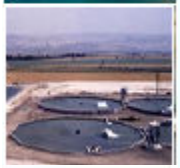





State of Israel

WATER AUTHORITY

Master Plan for the National Water Sector

Main Points of the Policy Paper

March 2012

State of Israel

WATER AUTHORITY

Background – Master Plan Structure

- Policy Paper (Master Plan / Strategic Plan)
- Implementation Plan / Action Plan

Two main stages:

- ❖ Planning
- ❖ Development Plan

Periodic updating of each stage with feedback between the stages

State of Israel

WATER AUTHORITY

Master Plan Steering

MZ

Israeli Water Authority
(IWA) Council

Steering Committee (Subcommittee – council)
IWA CEO Chairman

Small support team (IWA Management)
IWA CEO Chairman

Professional discussions (seminars, Internet)

Planning, Strategic Planning Division
Internal work team
General policy paper

Consultants & administrative support for program management

Water Authority employees
External bodies (Steering Committees)

Planning work

Policy papers domains

Slide 3

MZ2

את הריבועים ליישר לאותו רוחב
Miki Zaide, 21/02/2012

Methodology for Defining the Water System Management Policy

State of Israel
WATER AUTHORITY

National policy

Water Sector vision

External objectives

Internal objectives

- Nature
- Agriculture
- Regional Issues
- Other

- Cost
- Applicability
- Aquifer water quality
- Other…

Management of potable water

Management of drainage & runoff water

Management of sewage & treated wastewater

Other

- 'Inbar' Committee standards
- Other regulations
- Drinking water quality
- Other…

- Quality of reclaimed treated wastewater
- Assistance criteria
- Privatization
- Other…

1. Vision, objectives
2. Domains
3. Components
4. Alternatives
5. Indexes
6. Analysis of alternatives, according to the indexes
7. Choosing a preferred alternative
8. Operational recommendations
9. Integration and reciprocal relations
10. Drafting policy papers
11. Feedback and updating

A summary of the various policy papers comprises the policy document of the National Water Sector Master Plan

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Main Core Issues

1. Water balance, analysis under uncertainty (scenarios)
2. Management of the potable water system
3. Management of sewage and treated wastewater
4. Management of natural water sources
5. Water quality
6. Demand management
7. Urban water management
8. Water and agriculture
9. Management of drainage and runoff water
10. Water and energy
11. Environment and water for nature

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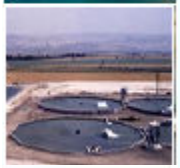
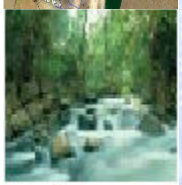
WATER AUTHORITY

Issues for Additional Attention

- *Structure of the water system*
- *Regulation*
- *The development policy*
- *Water security*
- *Climate change*
- *Capacity building and R&D*
- *Regional water arrangements*
- *Promotion of the water industry*






Policy Principles

State of Israel

WATER AUTHORITY

- ✓ Realization of Israel's national goals
- ✓ Improving governance
- ✓ Flexibility and deployment for activity under uncertainty
- ✓ Incorporation of sustainability principles of the development policy
- ✓ Water reliability of the National and local supply
- ✓ Management based on targets and indexes

State of Israel

WATER AUTHORITY

Vision of the Water Sector in Israel

Water is a basic element for both humans survival and for the environment.

The national water system constitutes a strategic infrastructure in Israel, and a crucial factor in its development and the realization of its national goals.

Management and sustainable development of the water resources should be carried out professionally, efficiently, fairly and transparently, and in accordance with advanced criteria, for the benefit of the public and the public health.

The natural sources of water will be rehabilitated and preserved.

The Israeli water system will be a global center for technologies and innovation in professional areas of the water industry, and a groundbreaking example of managing water resources under conditions of shortage.

Supreme objective – to ensure the supply of water, provision of sewage services and reusing treated wastewater and the management of drainage and runoff water – with appropriate quality, quantity and reliability, and in an economically viable manner, for the sustainable benefit of all consumers.

Master Plan for the National Water Sector
National Water Balance

רשות המים
אגף תכנון

Population and Specific Consumption

Year	National population (million)	Per capita consumption (cu.m./year)
2010	7.6	100
2020	9.1	99
2030	10.9	98
2050	15.6	95

Sources of Water (MCM/year)

Year	National freshwater	Saline	Treated wastewater (incl. Gush Dan Purification Plant)	Desalination of saline	Water desalination and import	Required completion	Total supply
2010	1,200	174	450	23	280	4	2,131
2020	1,140	150	573	50	750	9	2,672
2030	1,080	140	685	60	750	50	2,765
2050	1,020	130	930	70	750	671	3,571

Water Consumption (MCM/year)

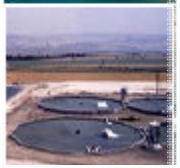
Year	Urban	Industry			Agriculture				Supply to Regional Neighbors	Rehabilitation of system storage	Nature and landscape		Unforeseeable	Total consumption
		Fresh-water	Saline	Total	Fresh-water	Saline	Treated waste-water (incl. Gush Dan Purification Plant	Total			Fresh-water	Total		
2010	764	90	30	120	500	144	400	1,044	143	0	10	60	0	2,131
2020	902	95	30	124	490	120	528	1,138	143	200	50	95	70	2,672
2030	1,064	99	30	129	470	110	645	1,225	143	0	50	90	114	2,765
2050	1,482	108	30	138	450	100	900	1,450	143	0	50	80	278	3,571

Components of the National Water System Balance – Principles of Main Premises and Trends (up to 2050)

State of Israel
WATER AUTHORITY

- **Urban consumption - double supply by 2050!** (1.4 billion cu/m/year)
  - **Population – 15 million people in 2050 (annual growth 1.8%)**
  - **Per capita urban and public consumption –**

    in 2010 - 100 cu.m/ year; in 2050 - decrease of about 5%
- **Natural water supply – gradual decrease of up to 15% (climate change, water quality) in 2050**
- **Rehabilitation of natural reservoirs – reaching about 2 billion cu.m over a decade, above operational Red Lines**
- **Allocation of water to nature – will increase significantly compared with the current situation**





Components of the National Water System Balance – Principles of Main Premises and Trends (up to 2050) – cont.

State of Israel

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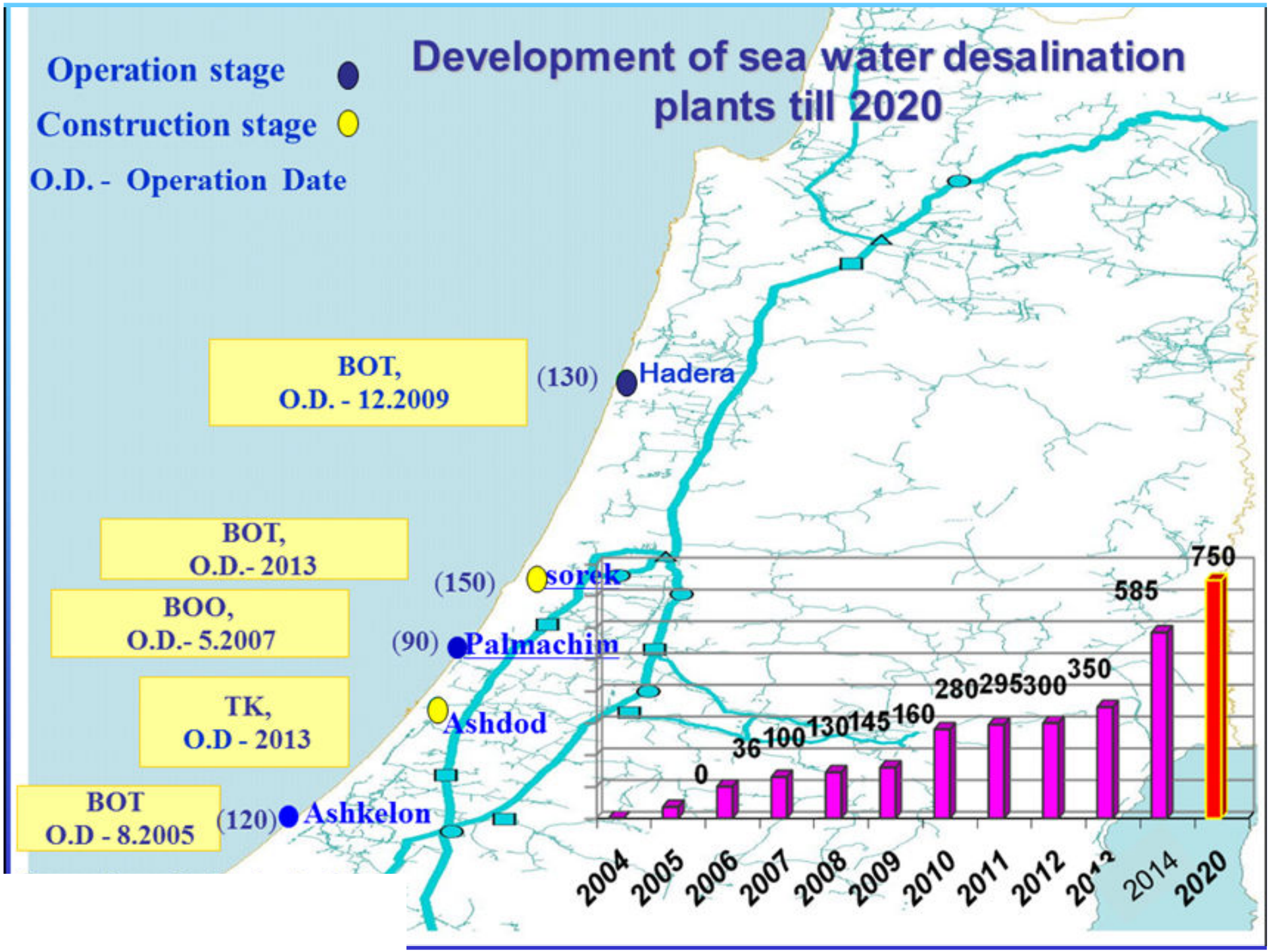
- **Volume of treated wastewater – double urban consumption will more than double treated wastewater volume (from about 400 million cu.m/year of reclaimed water in 2010 to about 900 million cu.m/year in 2050). Most will be used for agriculture.**
- **Agriculture –total water quantity will increase from ~1 billion cu.m in 2010 to ~1.5 billion cu.m in 2050. The increase will come largely from an increase in the supply of treated wastewater.**
- **Regional supply – Jordan & Palestinian Authority of ~145 million cu.m/year to be taken from Israel's national water system based on existing agreements.**
- **Deployment for different scenarios (unforeseeable) – added consumption of ~275 million cu.m/year in 2050, for various uses**

Required augmentation by artificial water sources (desalination, seawater and imports): ~750 million cu.m/year in 2020, and double that by 2050


Development of sea water desalination plants till 2020
Operation stage
Construction stage
O.D. - Operation Date
BOT,
O.D. - 12.2009
(130)
Hadera
BOT,
O.D.- 2013
(150)
sorek
BOO,
O.D.- 5.2007
(90)
Palmachim
TK,
O.D - 2013
Ashdod
BOT
O.D - 8.2005
(120)
Ashkelon
0
36
100
130
145
160
280
295
300
350
585
750
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2020

Main Policy on the Various Issues

Main Policies and Recommendations

Realizing the national goals

State of Israel

WATER AUTHORITY

- ✓ **The establishment of a 'National Planning Council' is of great importance.**
- ✓ **It is proposed that a national infrastructure coordination committee be established (water, gas, transportation, electricity).**

Main Policy Points and Recommendations
Governance

State of Israel
WATER AUTHORITY

- ✓ **Reinforcement and structural change of the Water Authority, to enable it to carry out its role of being a regulator.**
- ✓ **Central issues which necessitate structural arrangement:**
  - ❑ Urban water systems
  - ❑ Administering sewage water & treated wastewater systems
  - ❑ Administering runoff and drainage water

Main Policy Points and Recommendations

Capacity Building

State of Israel

WATER AUTHORITY

- ✓ **A national program to assess the shortage of manpower in the various areas of the national water sector, and preparation of a program for manpower development.**

Main Policy Points & Recommendations

Regulation

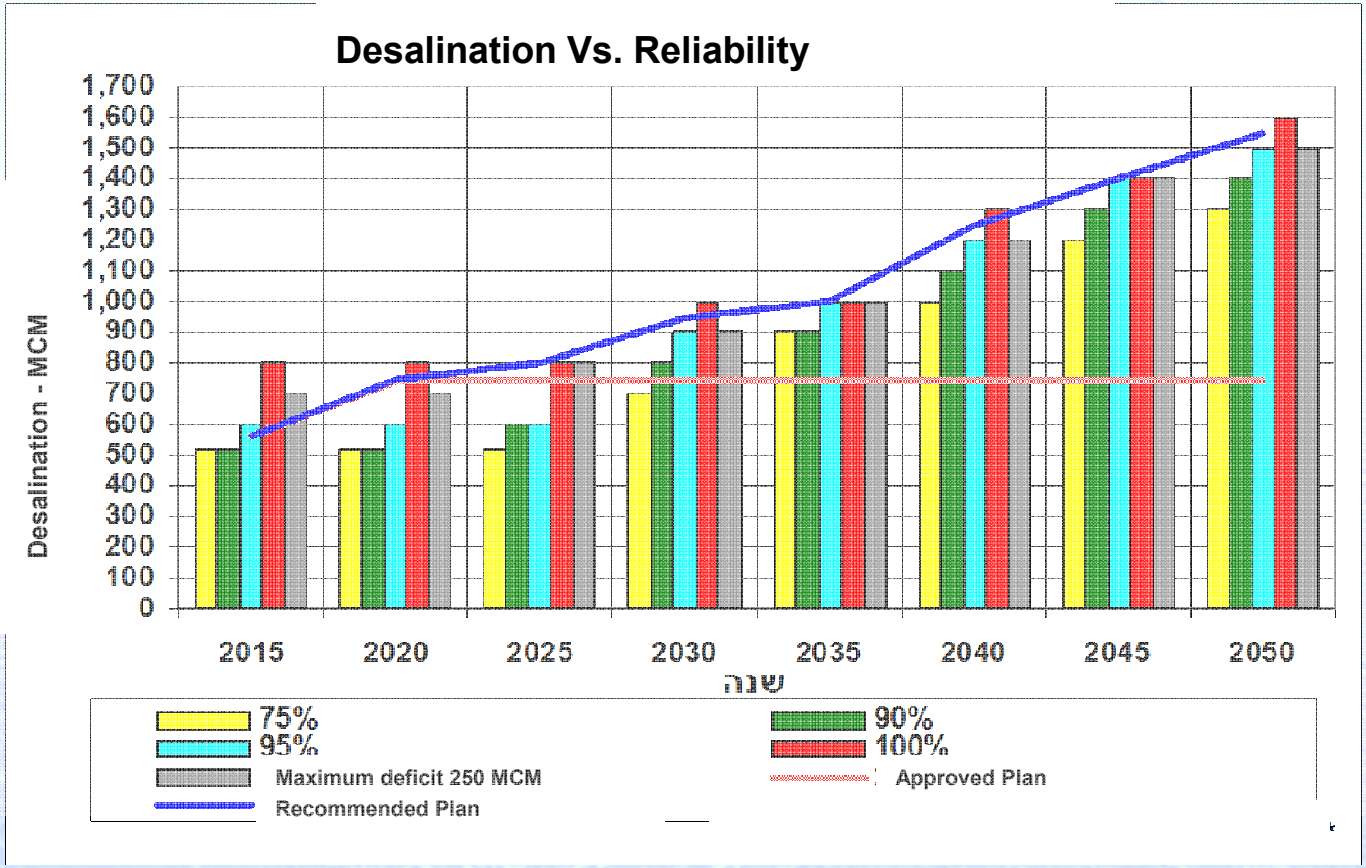
State of Israel
WATER AUTHORITY

- ✓ National resources will be administered based on full cost recovery
- ✓ The aim is minimize costs and to charge water tariffs that are as reasonable as possible
- ✓ Production levies and taxes should be allocated for developing the national water system
- ✓ Efforts should be made to minimize cross-subsidization between the various sectors when fixing water tariffs
- ✓ The planning of the Water Authority's development program will be funded by the water tariffs
- ✓ Mechanisms will be established to provide appropriate service to the public while ensuring balance between public & private interests

Main Policy Points and Recommendations
Administering the National Water System under Conditions of Uncertainty

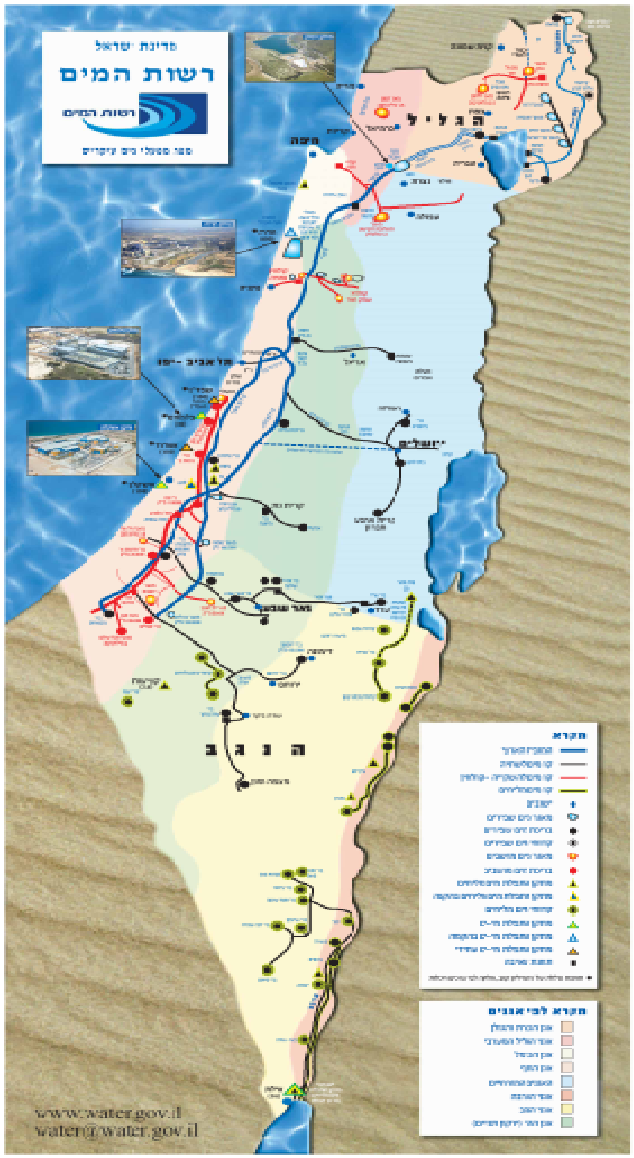
State of Israel
WATER AUTHORITY

- ✓ Measures should be taken to prepare for extreme scenarios in all areas of activity
- ✓ For the purpose of statutory safeguarding of land space for desalination plants – a "possibility of non-realization factor" was devised, which increased the recommended area.



Main Policy Points and Recommendations
Administering the National Freshwater System

State of Israel
WATER AUTHORITY

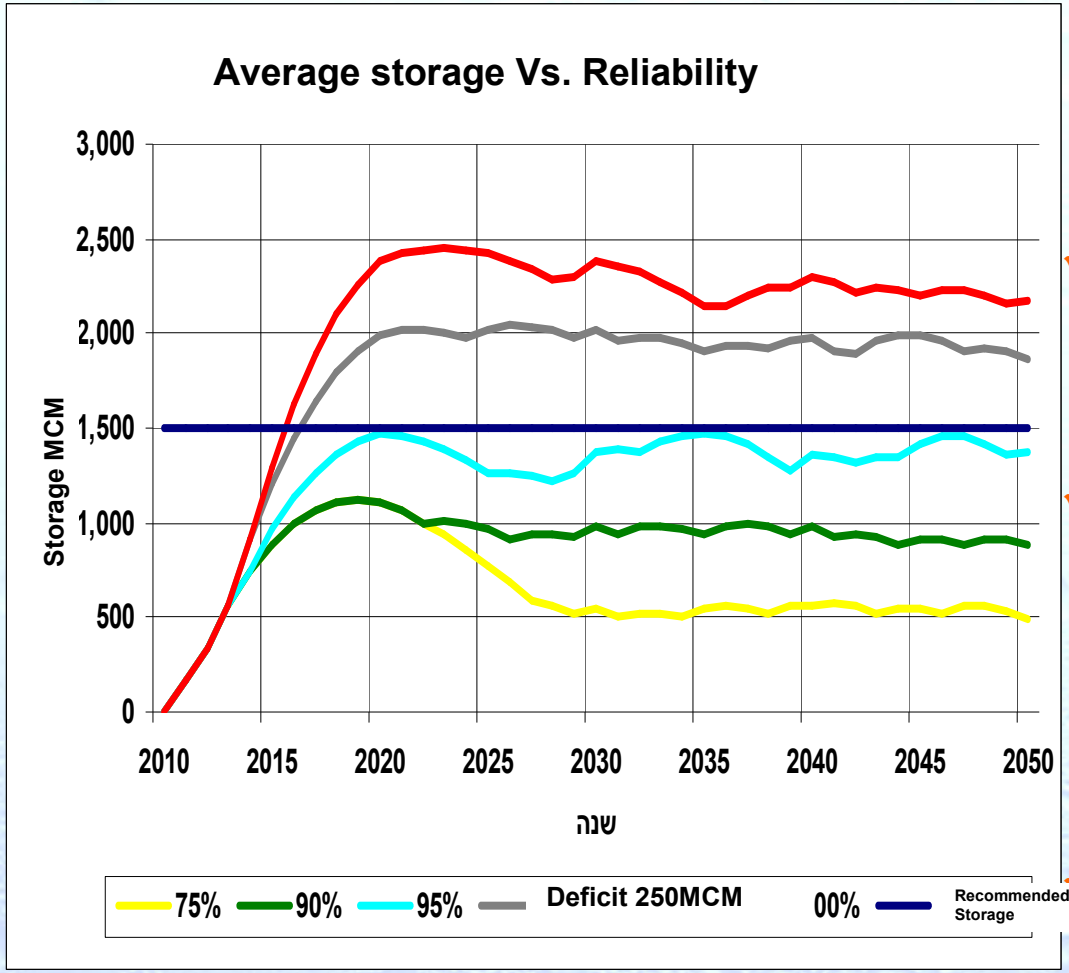


- ✓ **The national water system will be administered in a centralized and integrated manner.**
- ✓ **The Sea of Galilee will be designated primarily for use in northern Israel.**
- ✓ **Supply to the center of the country will be based on desalination plants, as a supplementary source to natural water sources.**
- ✓ **High supply reliability in the central, regional and local supply systems (aiming to establish: looped systems, a number of consumer connections from a range of water sources, storage, etc.)**


The Israeli Water System Development Plan 2020
קו מים שפירים
קו מים מלוחים
תחנת שאיבה
בריכת מים שפירים
מאגר מים שפירים
מתקן התפלת מי ים
מתקן התפלת מים מליחים
שדה הפקה קידוחי שפיר
שדה הפקה קידוחים מליחים
שפך מי רכז
מתקן התפלה חדרה
מתקן התפלה פלמחים
מתקן התפלה אשדוד
(איים מלאכותיים)
מאגר שפעה
תחנת חריש
תכנון קו מים שפירים לג'נין
מאגר ברקאי
(200 אלמ"ק)
בריכת קקון
(15 אלמ"ק)
תחנת בארותיים
בריכת מכמורת
(5 אלמ"ק)
תחנת עמק חפר
קו שרון צפוני
מפעל קרני שומרון-קדומים
תחנת רעננה
קו שרון דרומי
מאגר חורשים
(70 אלמ"ק)
תכנון קו מים שפירים ליו"ש
מפעל חוצה שומרון
80
מאגר קולה
(200 אלמ"ק)
ספריה
מפעל בנימין
בריכת מתיתיהו
מאגר פדיה
תחנת עין כרם
תחנת שואבה
מאגר בית זית
תחנת בית זית
תחנת כסלון
בית"ר עילית
תחנת עגור
מאגר חפץ חיים
(200 אלמ"ק)
100 מלמ"ש
זכיין - מקורות
תחנת ובריכה
קו ירקון מערבי
קו החמישי לירושלים
80"
100
קידודי יריחו

Main Policy Points and Recommendations
Managing the Natural Water Sources

State of Israel
WATER AUTHORITY



- ✓ National water sources will be rehabilitated and preserved as a strategic asset.
- ✓ As such, rehabilitation ranges will be determined.
- ✓ Operating lines (rule curves) will be determined for each of the natural water sources
- ✓ Over-extraction and dropping below “red lines” will be avoided

Main Policy Points and Recommendations

State of Israel
WATER AUTHORITY

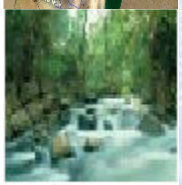
Administering the Sewage and Treated Wastewater System

- ✓ Urgent measures will be implemented to connect most sewage producers to sewage treatment plants.
- ✓ Collection & transport will be taken with priority given to major plants.
- ✓ The quality of treated wastewater will be enhanced (to 'Inbar' Committee levels over the decade and, subsequently, partially to drinking water quality level).
- ✓ In certain cases (where treated wastewater is not designated for agricultural use, and there is Ministry of Health approval) the advancement of "gray water" projects will be approved.










Main Policy Points and Recommendations

Water Quality

- ✓ Natural water sources, which were used for drinking water in the not too distant past, will be restored to drinking water quality.
- ✓ In addition to quantitative targets for rehabilitating water reserves, quality targets will be set for the natural water sources, as well as criteria for water quality to be supplied to all consumer sections .
- ✓ Other activities to be undertaken:
  - ❖ Supply of low salinity water to urban areas
  - ❖ Reduction of salt content and treatment of the water of the Sea of Galilee
  - ❖ Enhancing the natural water sources by removing contaminants and by other means

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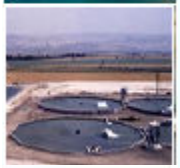
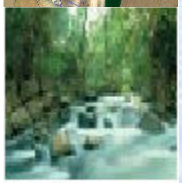





Main Policy Points and Recommendations

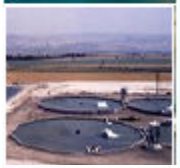
Demand Management

State of Israel

WATER AUTHORITY

Project	Investment in the coming decade (million NIS)	Annual savings (MCM/y)
Education and information	60	27.5
Water saving accessories	36	5.6
Handling domestic leakage, leaks from mains, and water loss and leakage in the rural community sector	501	44.8
Recycling gray water for water gardens at sports centers, recycling overspill at swimming pools	42	6
Water savings at mikvehs (ritual baths)	30	2.4
Water savings at car washes	6	16
Water savings at hospitals	6	0.8
Water savings at hotels	6	1.4
Cutting down on ornamental gardens (private and public) – master plans, upgrading automation systems, upgrading vegetation, conversion to treated wastewater	360	26
Synthetic grass	60	1.2
National water saving center	60	9
Total	1167	126

- ✓ Component equivalent to administering supply.
- ✓ Setting lower annual per capita consumption objectives compared with the past.
- ✓ Efficiency improvement measures will be introduced for water saving in all consumption sectors (technical, financial and informational).





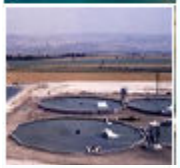
Main Policy Points and Recommendations

Water and Agriculture

State of Israel

WATER AUTHORITY

- ✓ Agriculture is a national objective of rural communities, social and environmental importance.
- ✓ The national water system will adapt itself to this objective (preferably in accordance with an approved master plan).
- ✓ Water is currently supplied in accordance with government resolutions and with the Water Agreement with the Farmers. Additional quantities of water will be supplied on request, based on covering full costs.
- ✓ Financial mechanisms will be devised to increase efficiency of water usage in agriculture (regional management, transferrable quotas).





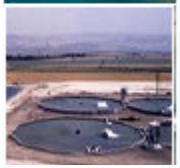
Main Policy Points and Recommendations

Management of Runoff and Drainage

State of Israel

WATER AUTHORITY

- ✓ Runoff should be considered a resource rather than a nuisance
- ✓ Basin-based master plans should be devised, that incorporate integration between administering basin runoff & urban runoff
- ✓ Consideration will be given to transferring responsibility for administering runoff and drainage in urban communities to the Water and Sewage Corporations
- ✓ Water sensitive construction should be advanced





Main Policy Points and Recommendations

Environment and Water for Nature

State of Israel

WATER AUTHORITY

- ✓ **Rehabilitation and preservation of water-dependant ecosystems should be primarily achieved by rehabilitating the natural sources of water**
- ✓ **Nature's needs for water will be defined and examined by an Inter-ministerial Public Committee**
- ✓ **Environmental principles will be applied during development of water infrastructures (in addition to financial incentives)**
- ✓ **External costs will be taken into consideration in analyzing the cost efficiency of alternatives for implementing projects**







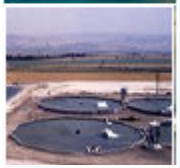

Main Policy Points and Recommendations

Urban Water Management

State of Israel

WATER AUTHORITY

- ✓ The number of corporations will be reduced.
- ✓ The corporations will be strengthened professionally, and their regulation will be enhanced.
- ✓ The urban water supply systems and monitoring systems should be upgraded.
- ✓ Provision of a suitable quality of services by corporations to consumers should be guaranteed.





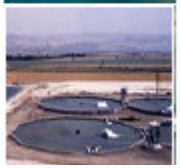
Main Policy Points and Recommendations

Water and Energy

State of Israel

WATER AUTHORITY

- ✓ **Coordination of infrastructure development between the national water system and national energy system will be enhanced.**





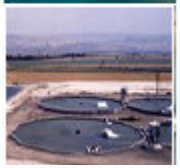
Main Policy Points and Recommendations

Regional Water Arrangements

State of Israel

WATER AUTHORITY

- ✓ **Deployment for future arrangements/ unilateral actions.**
- ✓ **Coordinated management the supply systems of Israel and the Palestinian Authority, while separating the supply systems.**
- ✓ **The Red Sea – Dead Sea conveyor will be advanced - contingent on the results of the feasibility study (as an international project).**





Investment Estimation Required for 2010-2050

(million NIS)

State of Israel

WATER AUTHORITY

	Fields of Activity in Water System	Estimate of Investment Required for different time spans			
		Short term (2010-14)	Medium term (2015019)	Long term (2020-50)	Total
1	Water savings	585	585	1,750	2,920
2	Desalination of seawater	3,050	2,270	8,910	14,230
3	Desalination of saline groundwater	260	160	-	420
4	Supply of water and developing the national system	4,335	6,660	26,520	37,515
5	Urban water and sewage corporations	5,020	5,420	30,050	50,490
6	Sewage activities by authorities that are not obliged to incorporate (regional council), and regional sewage channeling systems	1,250	1,320	8,390	10,960
7	Building and upgrading sewage treatment plants	575	575	10,660	11,810
8	Urban sewage corporations (Tel Aviv, Jerusalem, Haifa)	4,130	-	8,470	12,600
9	Reclamation of treated wastewater	1,725	2,575	7,330	11,630
10	Water quality	1,200	1,200	5,170	7,570
11	Runoff and drainage management	1,000	1,390	12,380	14,770
12	Rehabilitating streams	250	250	1,500	2,000
13	Advancing the water industry	250	250	500	1,000
14	Research and development	470	455	2,630	3,555
15	Unforeseen	2,400	2,300	20,180	24,880
	Total	26,500	25,400	154,450	206,350

Summary of National Water System Development Framework

State of Israel

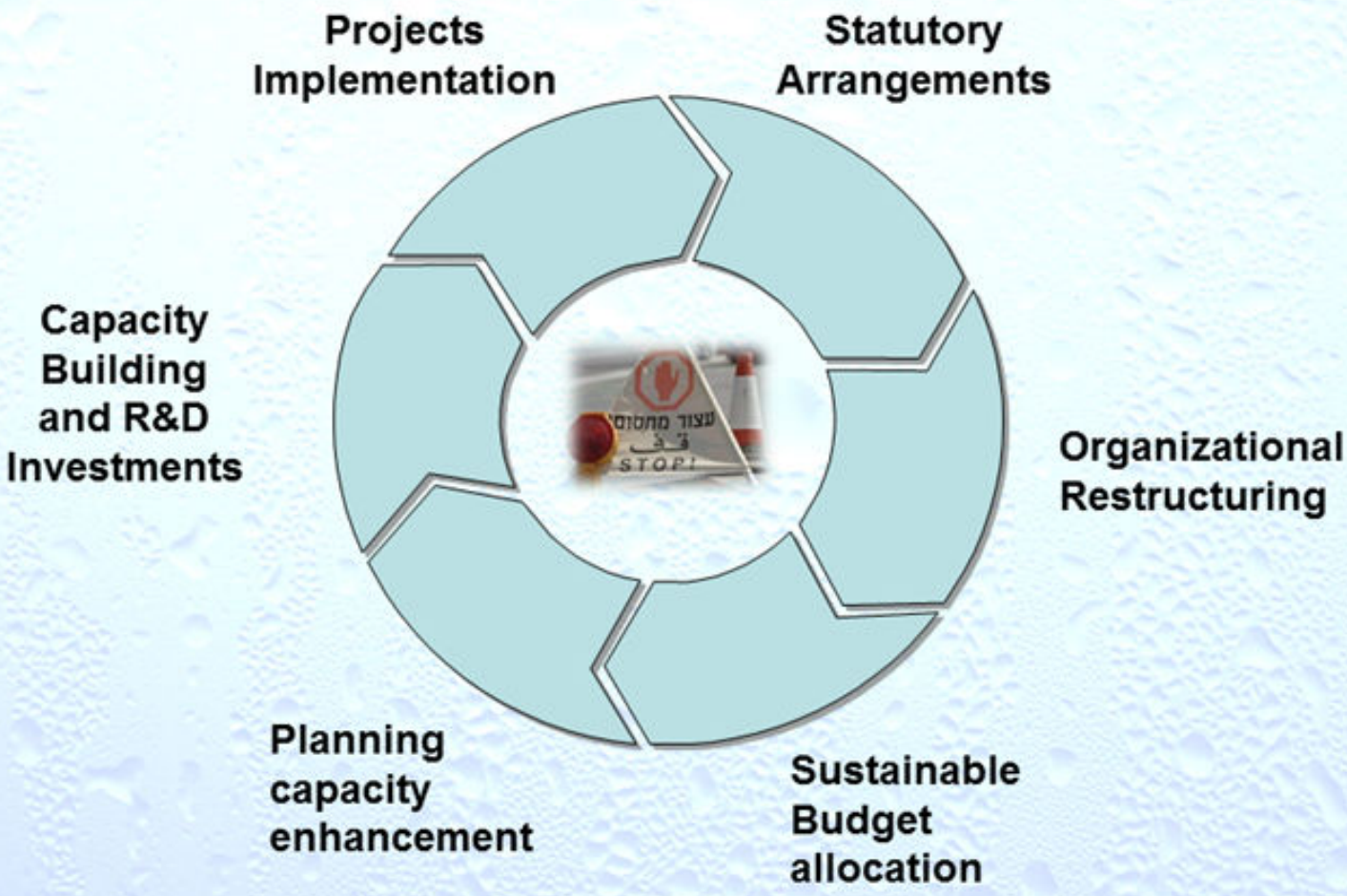
WATER AUTHORITY

Time Span	Required investment incl. unforeseeable (NIS b.)	Artificial freshwater production (m. (MCM/year)	Total treated wastewater reclamation (MCM/year)
By the end of 2009		174	380
Short term: current five-year period 2010-2014	26.5	603	510
Medium term: next five-year period (2015-2019)	25.4	845	580
Long term: 2020-2050	154.5	1,500	930
Total (inc. unforeseeable)	206.4	1,500	930

- Investment in the water system required up to 2050: about NIS 206 billion
- Average annual investment required: about NIS 5.15 billion (for 40 years)
- Current water tariffs can cover the cost of the development based on the above table and will not have to change substantially

Obstacles and Recommendations to Address Them

State of Israel
WATER AUTHORITY



Outline for the Future

State of Israel
WATER AUTHORITY

- Transferring policy paper to the Minister of Energy and Water, examining it, making required amendments and aiming to have it adopted by the government.

- Continued preparation the implementation plan
  - Organization – determining a management and steering mechanism.

  - Allocating resources for executing the implementation stage.

    - Defining and prioritizing planning tasks
    - The development plan – emphasis on a five-year plan.
    - Updating policy paper