Master Plan for the National Water Sector

Main Points of the Policy Paper

March 2012
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
Master Plan Steering

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

Planning work

Consultants & administrative support for program management

Policy papers domains

Water Authority employees
External bodies (Steering Committees)
את הריבועים ליישר利亚ות רוחב
Miki Zaide, 21/02/2012
Methodology for Defining the Water System Management Policy

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
<table>
<thead>
<tr>
<th>Main Core Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water balance, analysis under uncertainty (scenarios)</td>
</tr>
<tr>
<td>2. Management of the potable water system</td>
</tr>
<tr>
<td>3. Management of sewage and treated wastewater</td>
</tr>
<tr>
<td>4. Management of natural water sources</td>
</tr>
<tr>
<td>5. Water quality</td>
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<tr>
<td>6. Demand management</td>
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<tr>
<td>7. Urban water management</td>
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<tr>
<td>8. Water and agriculture</td>
</tr>
<tr>
<td>9. Management of drainage and runoff water</td>
</tr>
<tr>
<td>10. Water and energy</td>
</tr>
<tr>
<td>11. Environment and water for nature</td>
</tr>
</tbody>
</table>
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

- 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
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

<table>
<thead>
<tr>
<th>Year (National population (million))</th>
<th>Per capita consumption (cu.m./year)</th>
<th>Year</th>
<th>National freshwater</th>
<th>Saline</th>
<th>Treated wastewater (incl. Gush Dan Purification Plant)</th>
<th>Desalination of saline</th>
<th>Water desalination and import</th>
<th>Required completion</th>
<th>Total supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>7.6</td>
<td>100</td>
<td>2010</td>
<td>1,200</td>
<td>174</td>
<td>450</td>
<td>23</td>
<td>280</td>
<td>4</td>
</tr>
<tr>
<td>2020</td>
<td>9.1</td>
<td>99</td>
<td>2020</td>
<td>1,140</td>
<td>150</td>
<td>573</td>
<td>50</td>
<td>750</td>
<td>9</td>
</tr>
<tr>
<td>2030</td>
<td>10.9</td>
<td>98</td>
<td>2030</td>
<td>1,080</td>
<td>140</td>
<td>685</td>
<td>60</td>
<td>750</td>
<td>50</td>
</tr>
<tr>
<td>2050</td>
<td>15.6</td>
<td>95</td>
<td>2050</td>
<td>1,020</td>
<td>130</td>
<td>930</td>
<td>70</td>
<td>750</td>
<td>671</td>
</tr>
</tbody>
</table>

## Water Consumption (MCM/year)

<table>
<thead>
<tr>
<th>Year</th>
<th>Urban</th>
<th>Industry</th>
<th>Agriculture</th>
<th>Supply to Regional Neighbors</th>
<th>Rehabilitation of system storage</th>
<th>Nature and landscape</th>
<th>Unforeseeable</th>
<th>Total consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fresh-water</td>
<td>Saline</td>
<td>Total</td>
<td>Fresh-water</td>
<td>Saline</td>
<td>Treated wastewater (incl. Gush Dan Purification Plant)</td>
<td>Total</td>
<td>Fresh-water</td>
</tr>
<tr>
<td>2010</td>
<td>764</td>
<td>90</td>
<td>30</td>
<td>120</td>
<td>500</td>
<td>144</td>
<td>400</td>
<td>1,044</td>
</tr>
<tr>
<td>2020</td>
<td>902</td>
<td>95</td>
<td>30</td>
<td>124</td>
<td>490</td>
<td>120</td>
<td>528</td>
<td>1,138</td>
</tr>
<tr>
<td>2030</td>
<td>1,064</td>
<td>99</td>
<td>30</td>
<td>129</td>
<td>470</td>
<td>110</td>
<td>645</td>
<td>1,225</td>
</tr>
<tr>
<td>2050</td>
<td>1,482</td>
<td>108</td>
<td>30</td>
<td>138</td>
<td>450</td>
<td>100</td>
<td>900</td>
<td>1,450</td>
</tr>
</tbody>
</table>
Components of the National Water System Balance –
Principles of Main Premises and Trends (up to 2050)

- 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.

- **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

- BOT, O.D. - 12.2009
- BOT, O.D. - 2013
- BOO, O.D. - 5.2007
- TK, O.D. - 2013
- BOT, O.D. - 8.2005

Key:
- Operation stage
- Construction stage
- O.D. - Operation Date

Map locations:
- Hadera
- Sorkek
- Palmachim
- Ashdod
- Ashkelon

Graph:
- Water output from 2004 to 2020
- Peaks at 750, 585, 350, 300, 280, 295, 210, 160, 145, 130, 100, 36
Main Policy on the Various Issues
✓ 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).
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
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

✓ 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
✓ 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.
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.)
Main Policy Points and Recommendations
Managing the Natural Water Sources

- 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

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.
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
Main Policy Points and Recommendations

Demand Management

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

- 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

✓ 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

- 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

✓ Rehabilitation and preservation of water-dependent 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

- 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

 ✓ Coordination of infrastructure development between the national water system and national energy system will be enhanced.
Main Policy Points and Recommendations

Regional Water Arrangements

- 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).
<table>
<thead>
<tr>
<th>Fields of Activity in Water System</th>
<th>Estimate of Investment Required for different time spans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Water savings</td>
<td>585</td>
</tr>
<tr>
<td>2 Desalination of seawater</td>
<td>3,050</td>
</tr>
<tr>
<td>3 Desalination of saline groundwater</td>
<td>260</td>
</tr>
<tr>
<td>4 Supply of water and developing the national system</td>
<td>4,335</td>
</tr>
<tr>
<td>5 Urban water and sewage corporations</td>
<td>5,020</td>
</tr>
<tr>
<td>6 Sewage activities by authorities that are not obliged to incorporate (regional council), and regional sewage channeling systems</td>
<td>1,250</td>
</tr>
<tr>
<td>7 Building and upgrading sewage treatment plants</td>
<td>575</td>
</tr>
<tr>
<td>8 Urban sewage corporations (Tel Aviv, Jerusalem, Haifa)</td>
<td>4,130</td>
</tr>
<tr>
<td>9 Reclamation of treated wastewater</td>
<td>1,725</td>
</tr>
<tr>
<td>10 Water quality</td>
<td>1,200</td>
</tr>
<tr>
<td>11 Runoff and drainage management</td>
<td>1,000</td>
</tr>
<tr>
<td>12 Rehabilitating streams</td>
<td>250</td>
</tr>
<tr>
<td>13 Advancing the water industry</td>
<td>250</td>
</tr>
<tr>
<td>14 Research and development</td>
<td>470</td>
</tr>
<tr>
<td>15 Unforeseen</td>
<td>2,400</td>
</tr>
<tr>
<td>Total</td>
<td>26,500</td>
</tr>
</tbody>
</table>
### Summary of National Water System Development Framework

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

- 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

- Projects Implementation
- Statutory Arrangements
- Capacity Building and R&D Investments
- Organizational Restructuring
- Planning capacity enhancement
- Sustainable Budget allocation
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