An Israeli Experience:

Facing
Water
Challenges
In
Scarce
Areas

Danny Greenwald Noumea April, 2018

A Sustainable Approach to Managing Our Water

IWRM
Integrated Water
Resources
Management

Covernance and
Regulation

Development
of Existing and
New Resources



Location & Geography







Scale







Area (km²)	18,500	20,770
GDP (\$ per capita)	38,000	37,500
Population (millions)	0.275	8.8
Density (1/ km²)	15	400



Israel Water Sector - Visit Card

Annual Water Supply

≈ 2.1 billion m³





200.000 Ha irrigated fields 14,000 farms



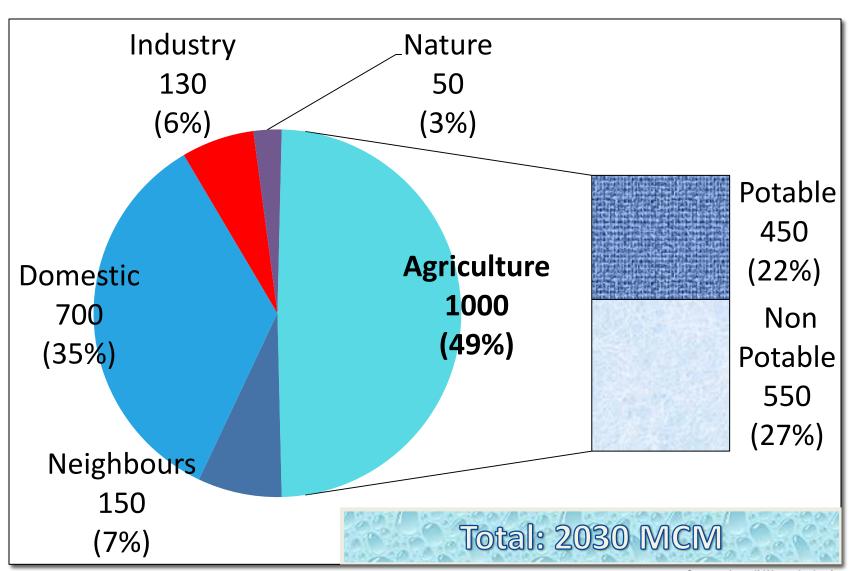
Over 1.000 Industrial plants







Water Consumption in Israel - 2017







- Average total natural enrichment 1.17 billion m³/annum
- Water consumption more than 2 billion m³/annum
- Annual Shortage of over ~45%
- Daily Domestic Consumption Per Capita ~170 Liters

IWRM
Integrated Water
Resources
Management



Main Water Supply System



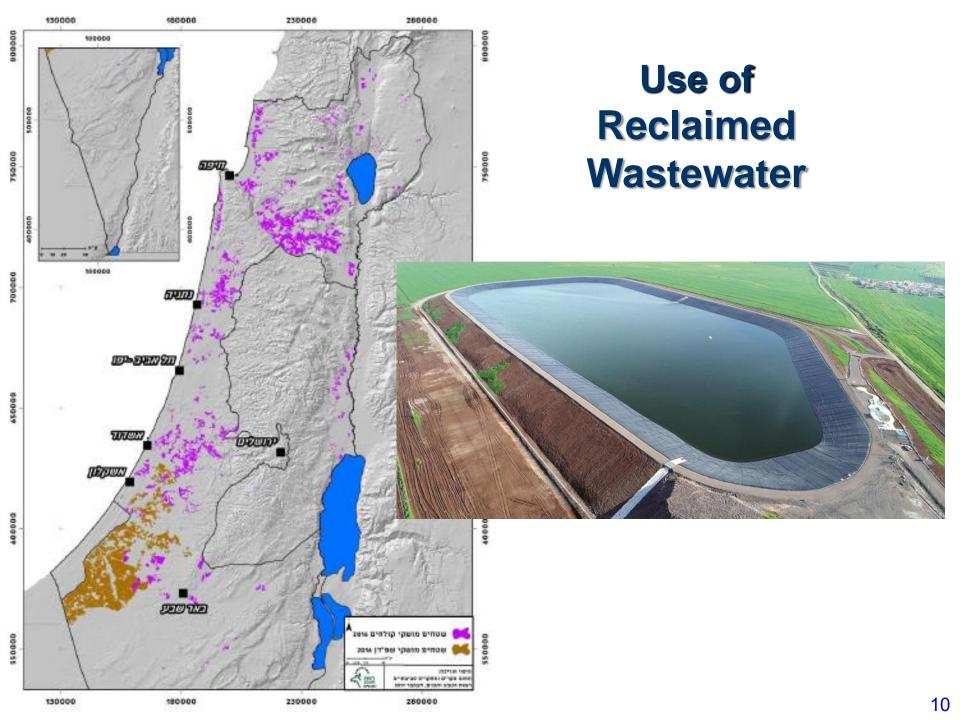
Sea of Galilee

The Mountain Aquifer



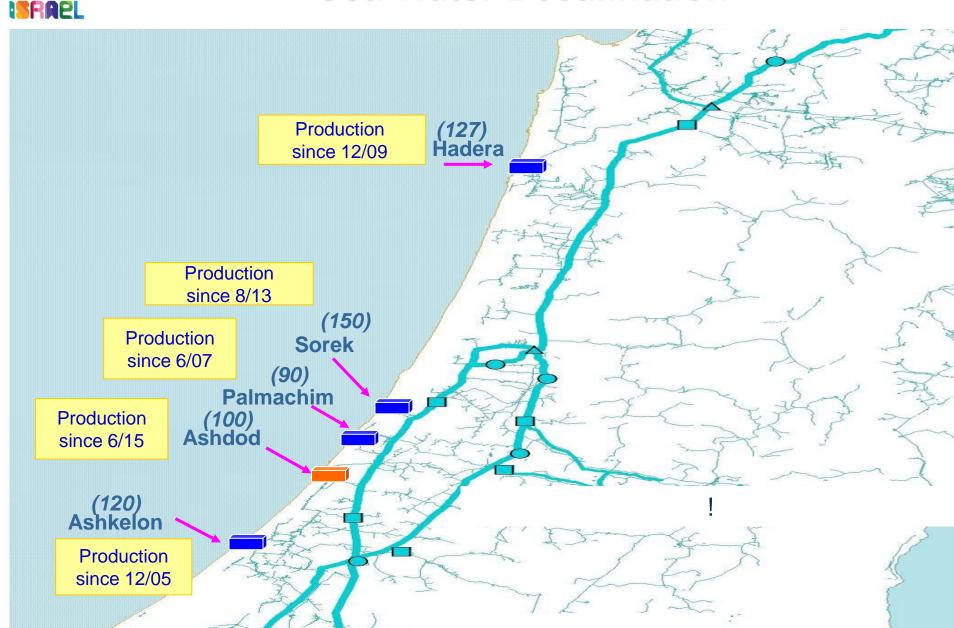
The National Carrier Established in the 1950s & 1960s





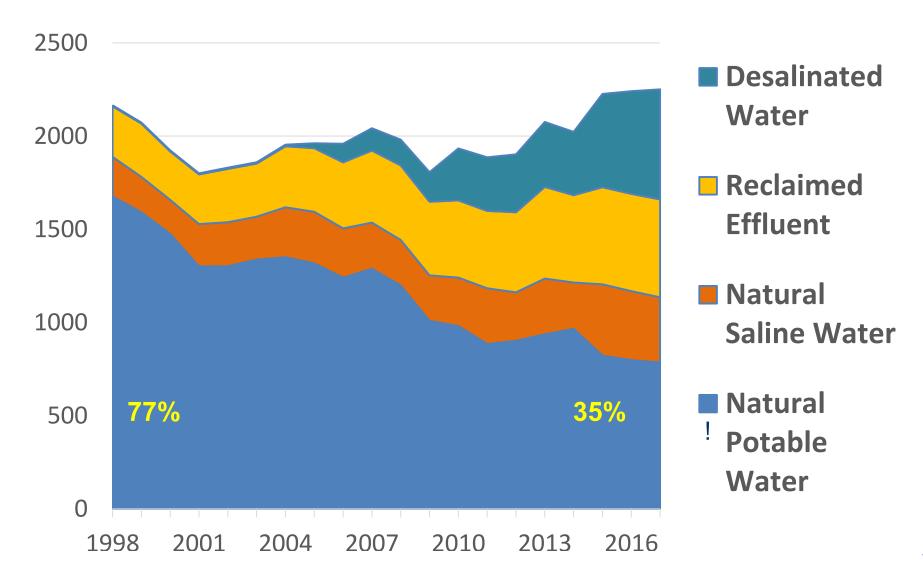


Sea Water Desalination



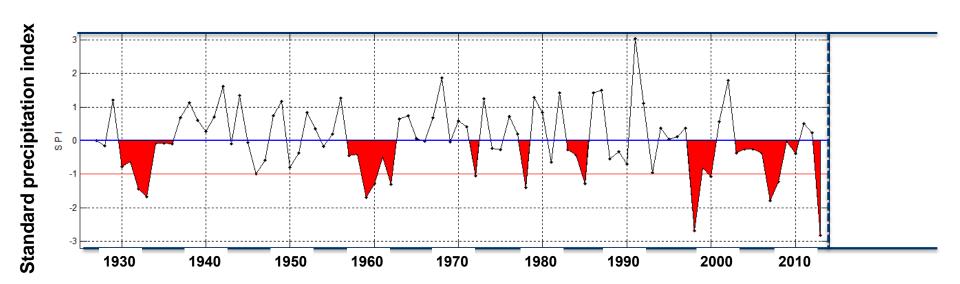


Water Supply by Resources (MCM) in Israel 1998 -2017





Simulated Droughts



Drought magnitude, intensity and duration are expected to increase in the future



Governance and Regulation

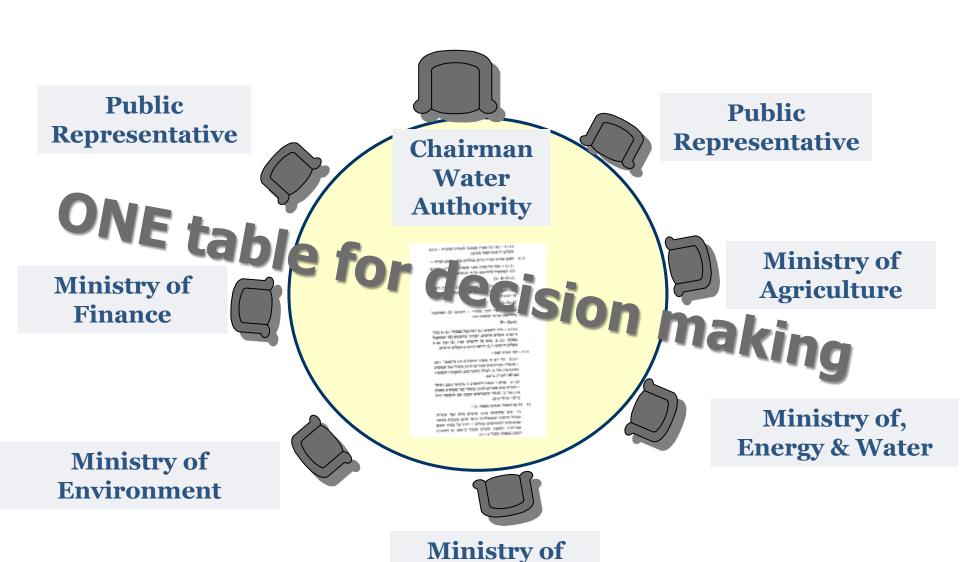


From The Israeli Water Law - chapter 1

"The country's water resources are public property, controlled by the state and are designated for the needs of its residents and the development of the country.."

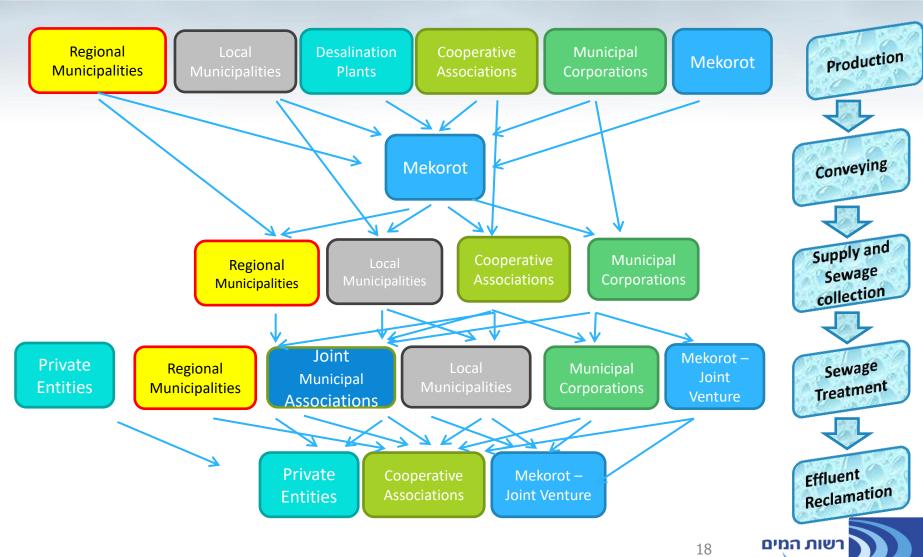


The Water Authority Board



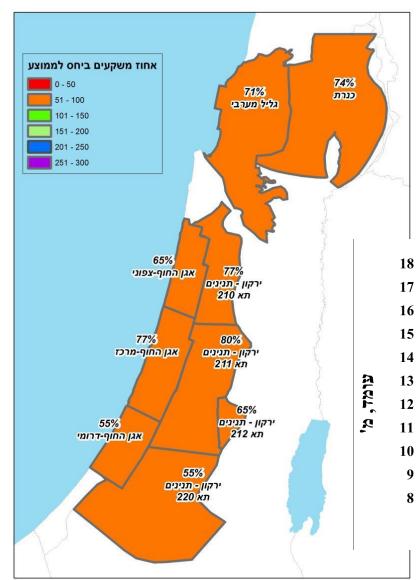
Interior

The Main Water Sector Players

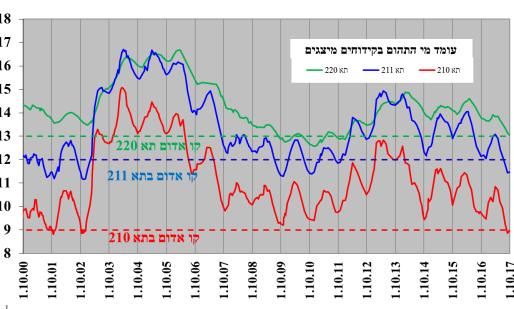




Water Resource Database



All of the water production (wells, pumps, sewage treatment) is metered & transferred the Water Authority





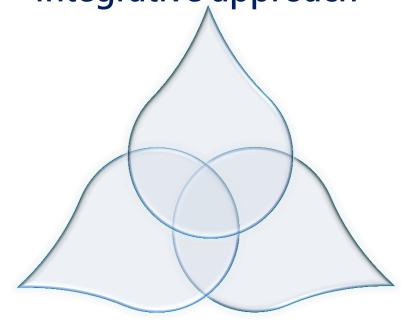
Regulation:

- One decision making regulatory body
- Professional (not political) level

Integrative approach

Finance:

- Cost recovery for suppliers
- Fairness and uniformity for consumers



Service Standards:

- Investments in infrastructure
- High quality standards for end users

The Water Authority – Governance Principals



Water Tariffs for the Domestic Sector

Two-block tariff system:

- Below 3.5 m3/person/month the rate is ~ 2.2 \$/m3
- Above 3.5 m3/person/month the rate is ~ 3.5 \$/m3
 - Progressive pricing
 - Encouraging conservation
 - Cost recovery



1\$= 3.5 NIS



Water Tariffs for the Agriculture Sector

- Reclaimed wastewater for unlimited irrigation is ~0.33 \$/m3
- Reclaimed wastewater for limited irrigation is ~0.28 \$/m3
- Potable water for Agriculture is ~0.56 \$/m3

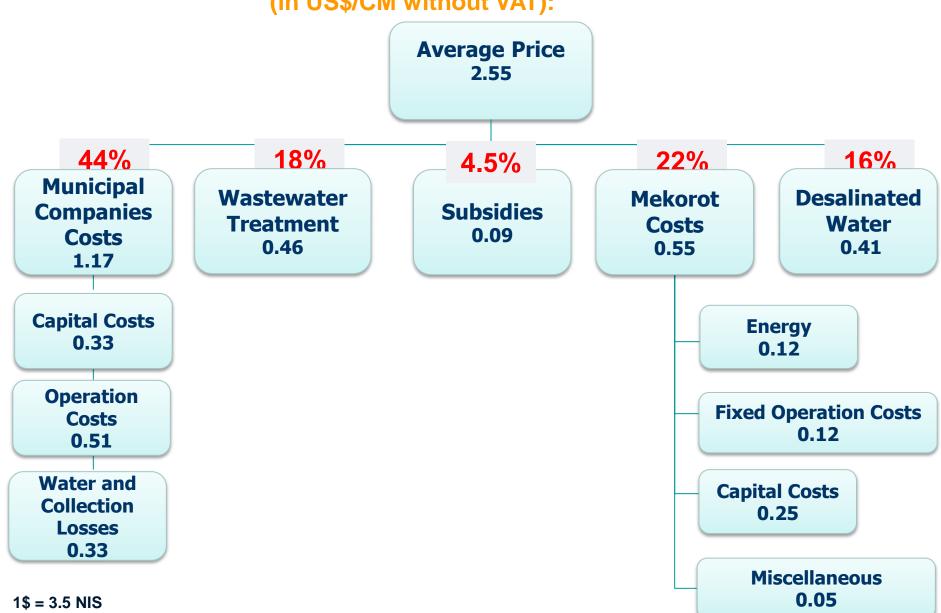






Municipal Water Prices Components – 2016

(in US\$/CM without VAT):





Efficient Use



Encouraging effective water use

- Water Measurement
- Water Tariffs
- Water Quotas
- R&D







Agriculture

- Methods of agricultural cultivation in Israel are constantly modernized and innovated: pressurized irrigation, drip irrigation, metering, automation, filtration, fertilization, greenhouses and more
- Israel became an international leader in developing water saving technology in agriculture

Pressurized irrigation systems

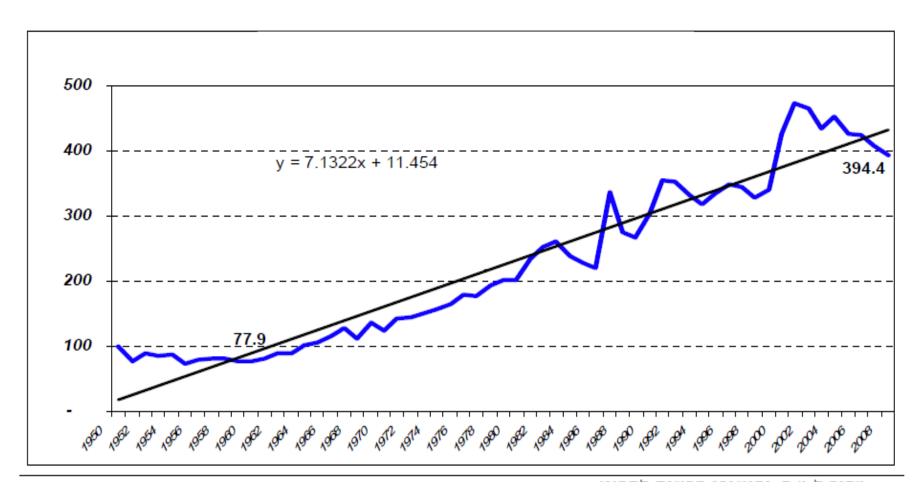




WATER AUTHORITY

Water use efficiency - agri

(production output / water use) 1950-2008





Municipal

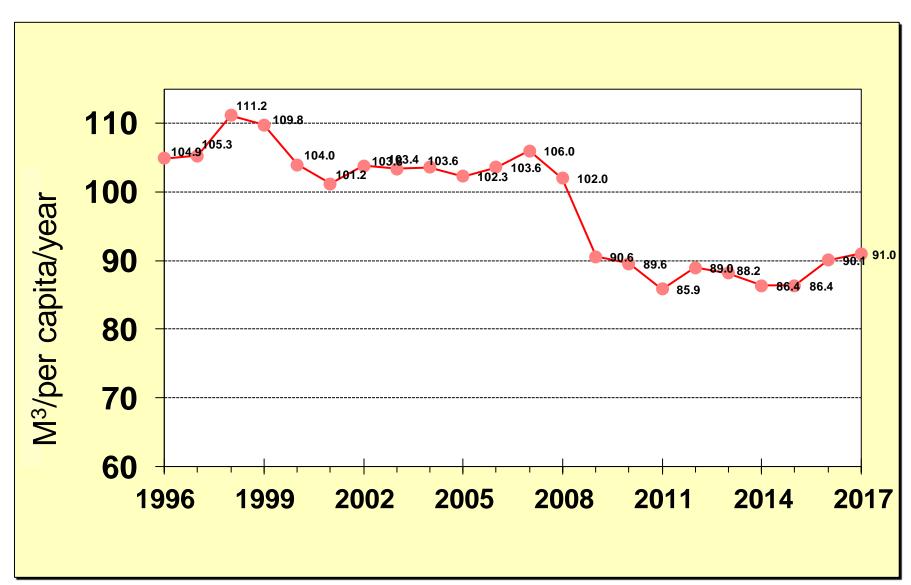
- Education, Advertising
- Metering
- Water Prices
- Gardening
- Smart Cities Technologies
- Municipal Corporations





Municipal Water Consumption

1996-2017





Development of Existing and New Resources



Manufactured Water

- Reclaimed waste water
- Desalination







Use of Reclaimed Wastewater

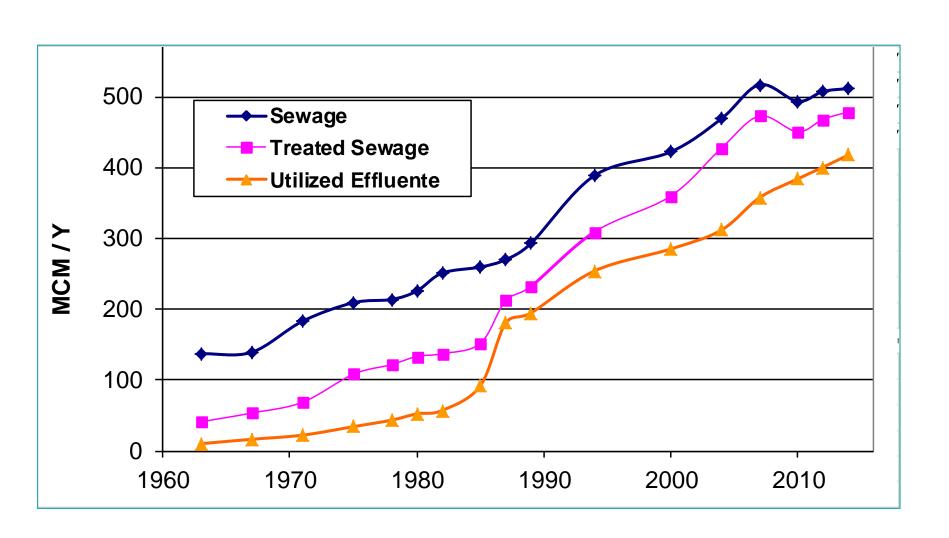
- With governmental support, sewage infrastructures have been developed and upgraded nationwide, what enabled turning the environmental hazard to resource.
- Annual Reuse of ≈ 450 MCM, about 82% of the sewage.
- Reclaimed Wastewater use for agriculture, exceeded potable water use.







Wastewater & Reclaimed Wastewater in Israel







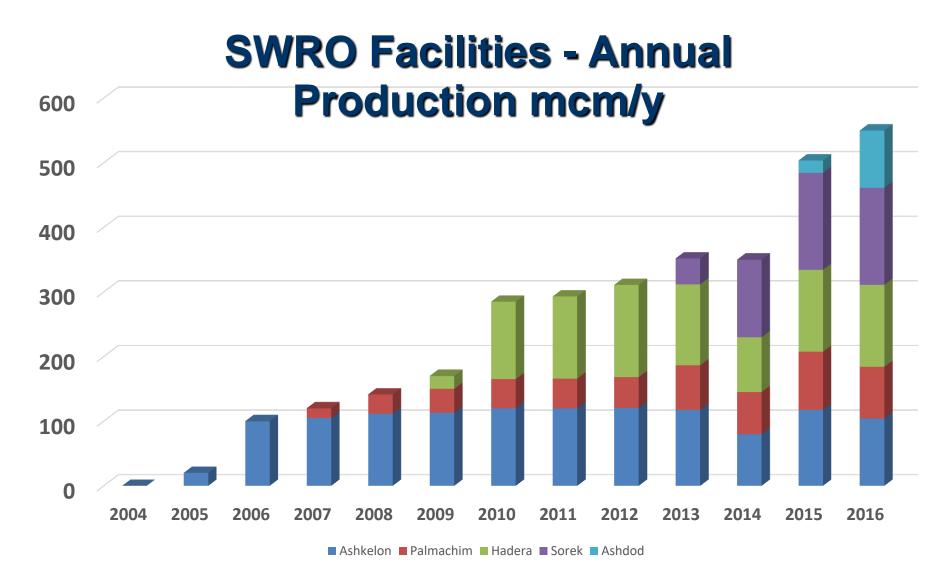




5 Large Scale Facilities in less than 15 years

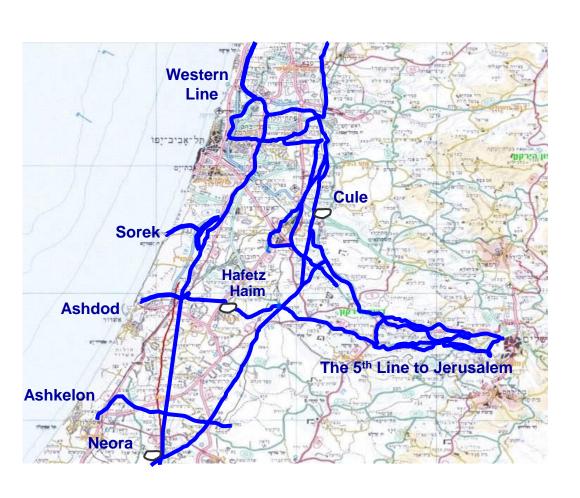








SWRO facilities connection - Revolution in the National System operation





A Sustainable Approach to Managing Our Water

IWRM
Integrated Water
Resources
Management

Covernance and
Regulation

Development
of Existing and
New Resources

An Israeli Experience:

Merci beaucoup!

Noumea April, 2018