



The Chief Scientist Office

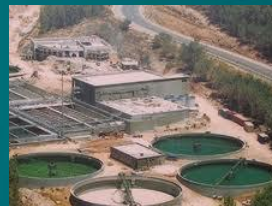
# Innovative Approaches to Water Resource Management – an Israeli Perspective

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Energy and Water Resources  
[www.energy.gov.il](http://www.energy.gov.il)



# The holy land is not Egypt...

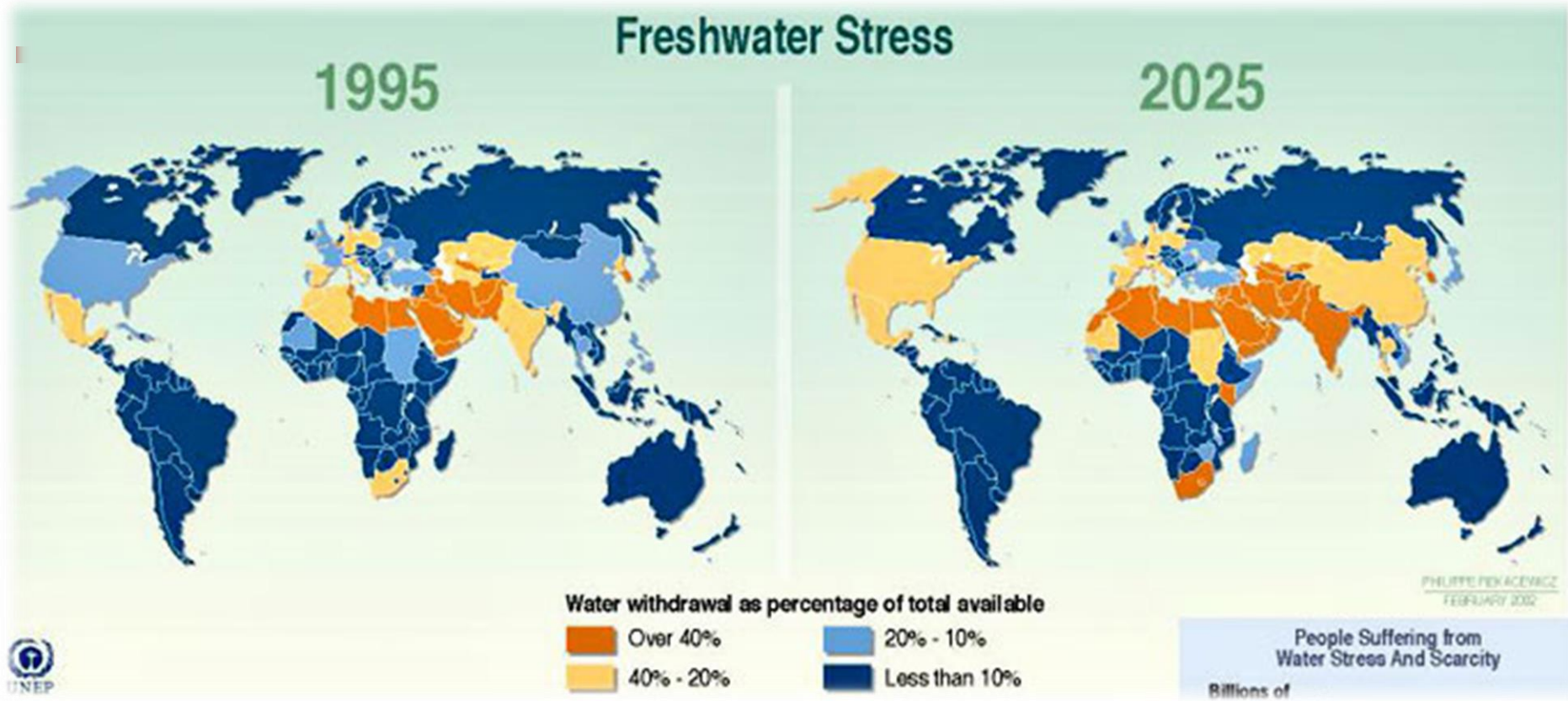


“10 For the land, whither thou goest in to possess it, is not as the land of **Egypt**, from whence ye came out, where thou didst sow thy seed, and didst **water it with thy foot, as a garden of herbs**;

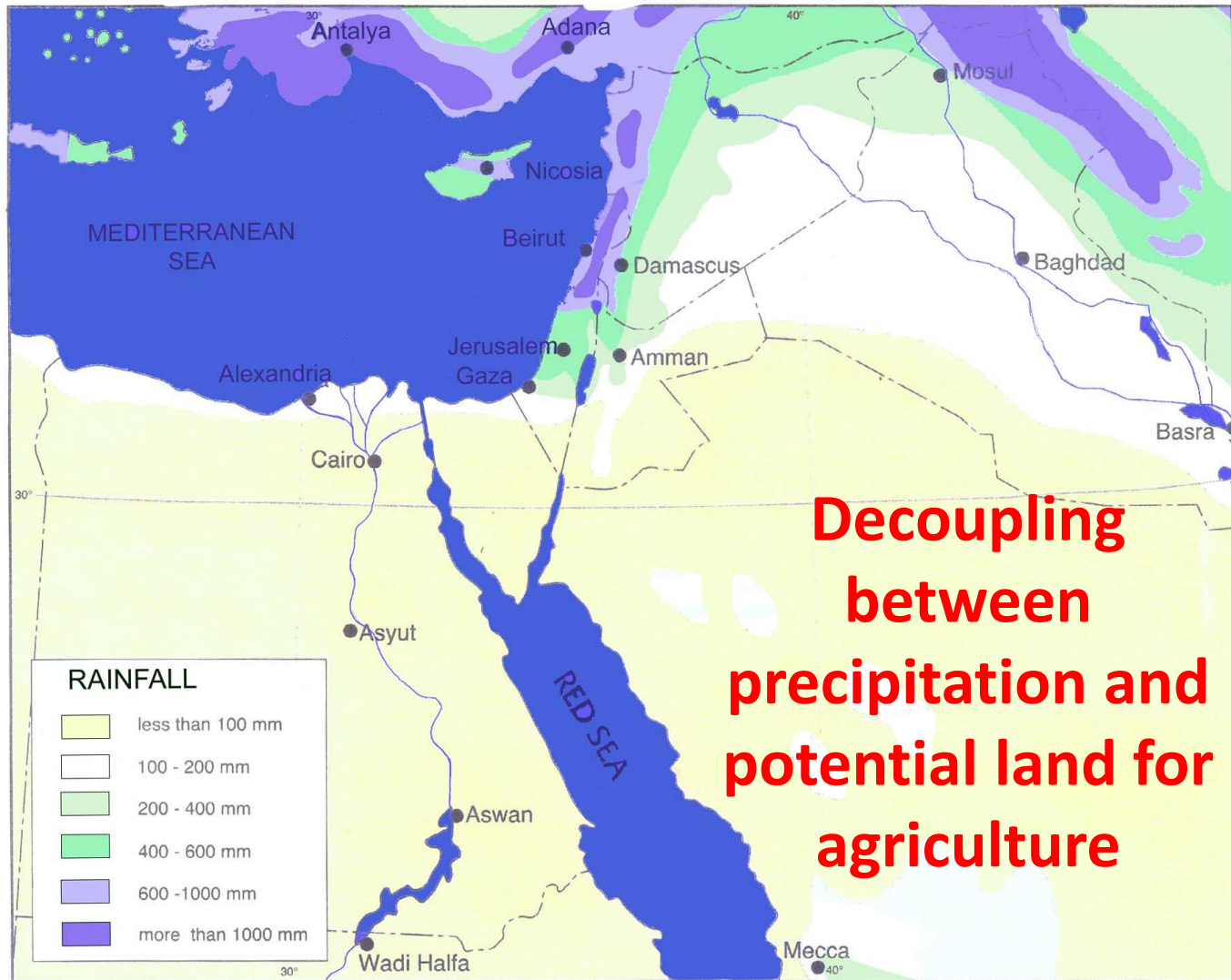
11 but the land, whither ye go over to possess it, is a land of hills and valleys, and **drinketh water as the rain** of heaven cometh down;"

**Deuteronomy, 11, 10-11**

# World Freshwater Stress

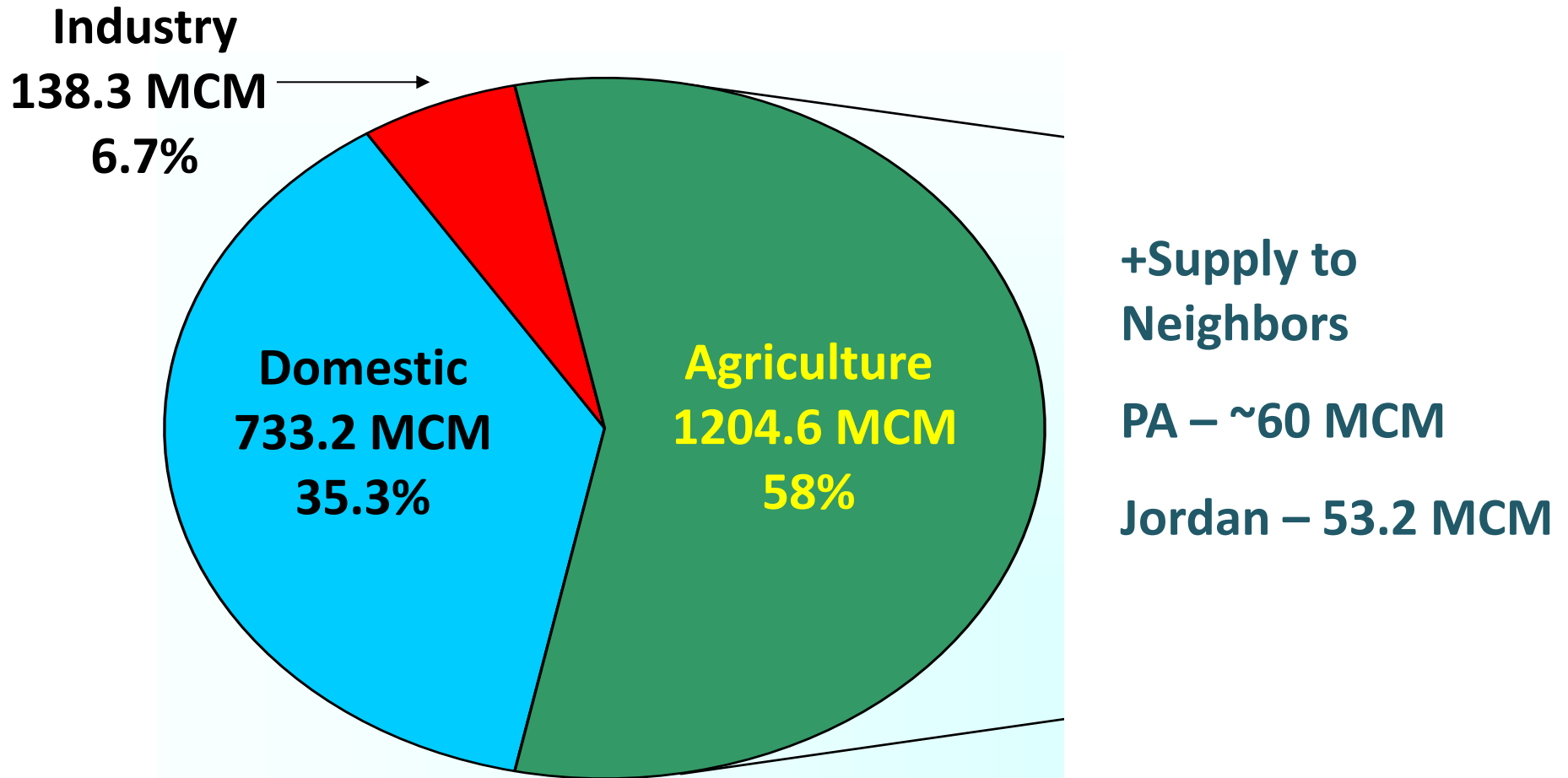


# The Desert strip in the Middle East





# Water demand



**Total annual demand of about 2200 MCM**

# Natural water enrichment



Sea of Galilee

450 MCM/year

Aquifers:

Costal

240 MCM/year

Mountain

340 MCM/year

Total (including other small aquifers)

1170 MCM/year

# Water Gap

**NATURAL WATER  
RESOURCES**

**1.17 billion MCM/year**

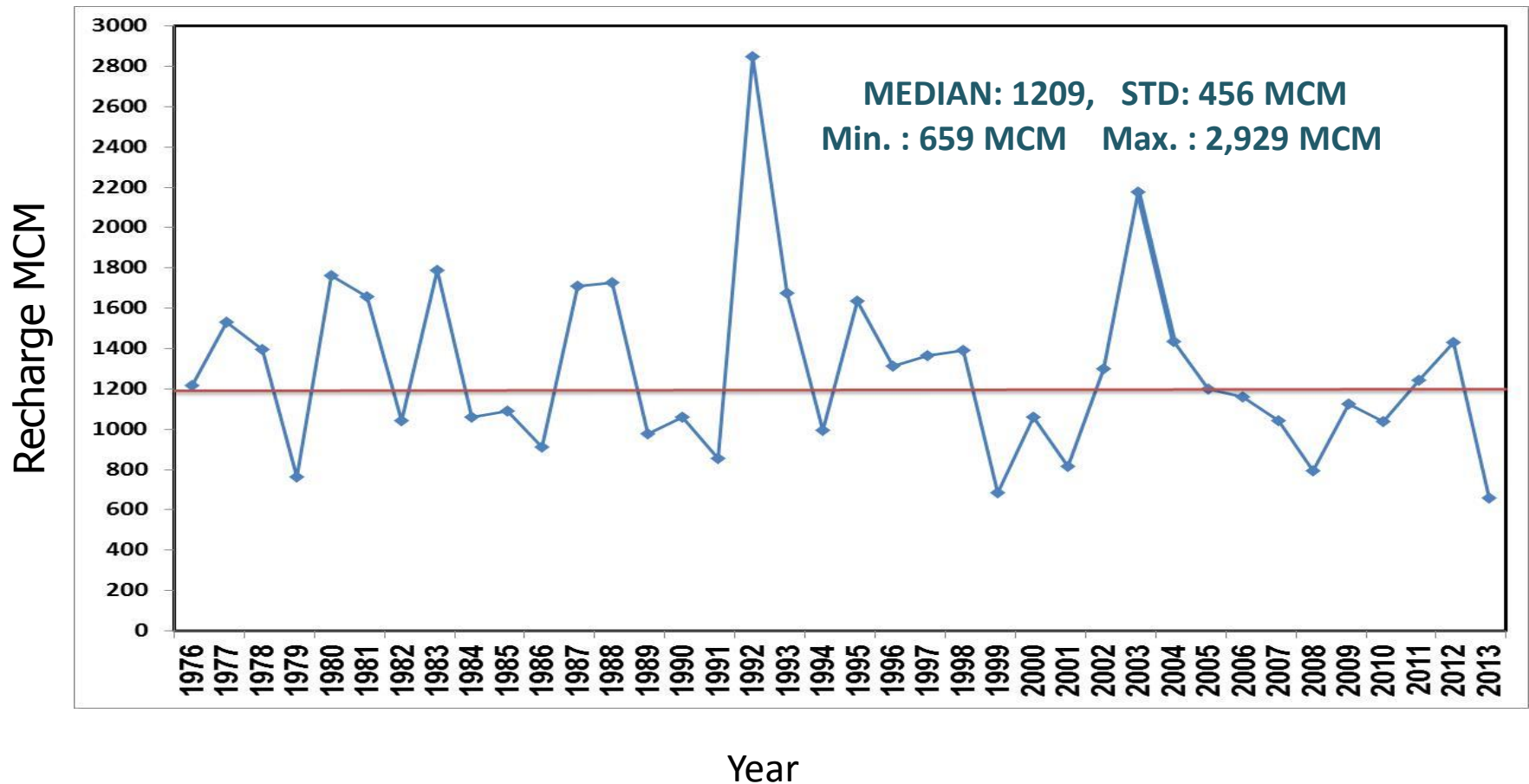


**WATER DEMAND**

**2 billion MCM/year**

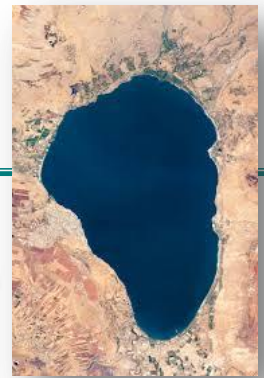
# Instability of water resources

## Natural enrichment of natural resources

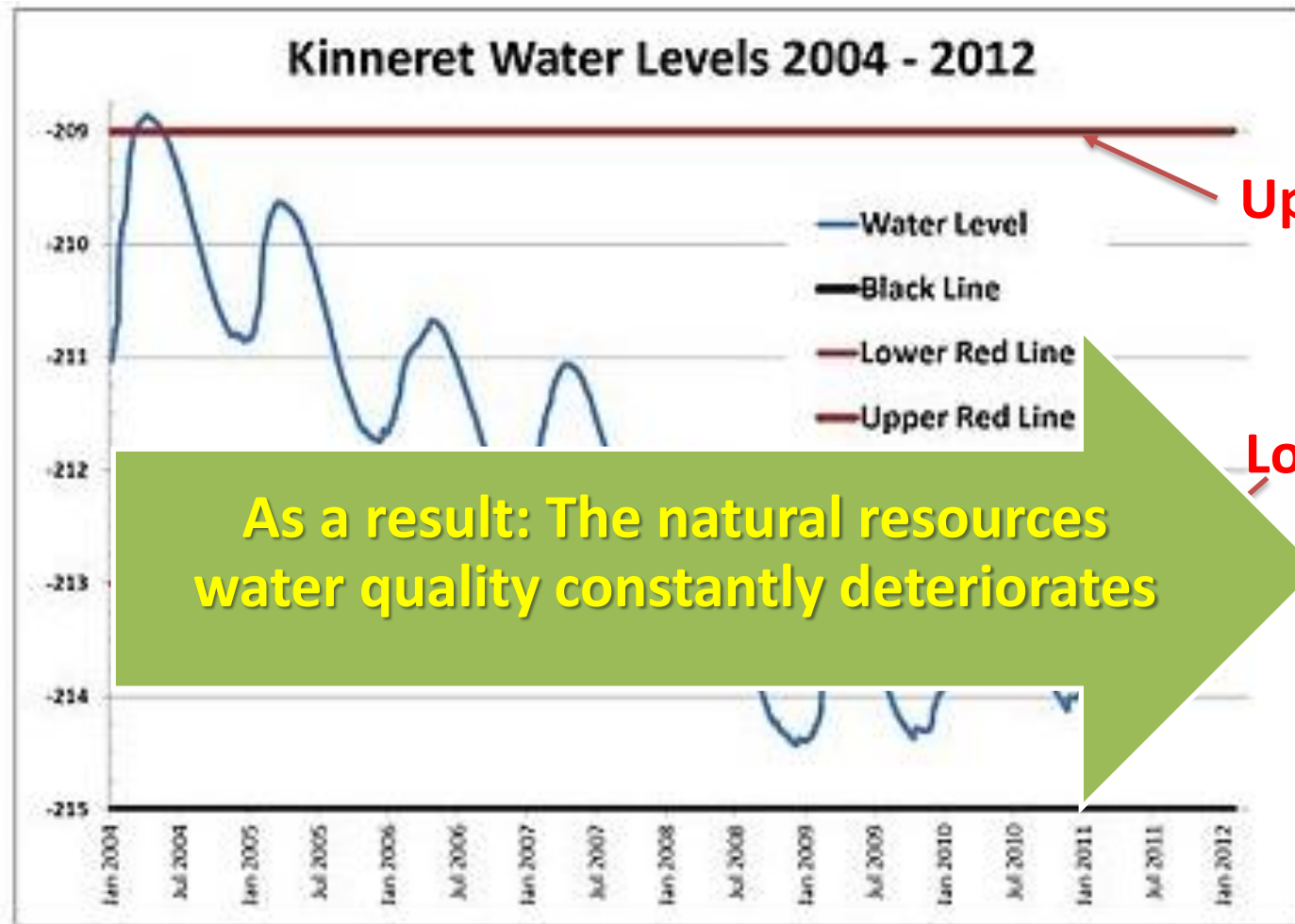




# Walking on the edge policy....



Water level (m above sea level)



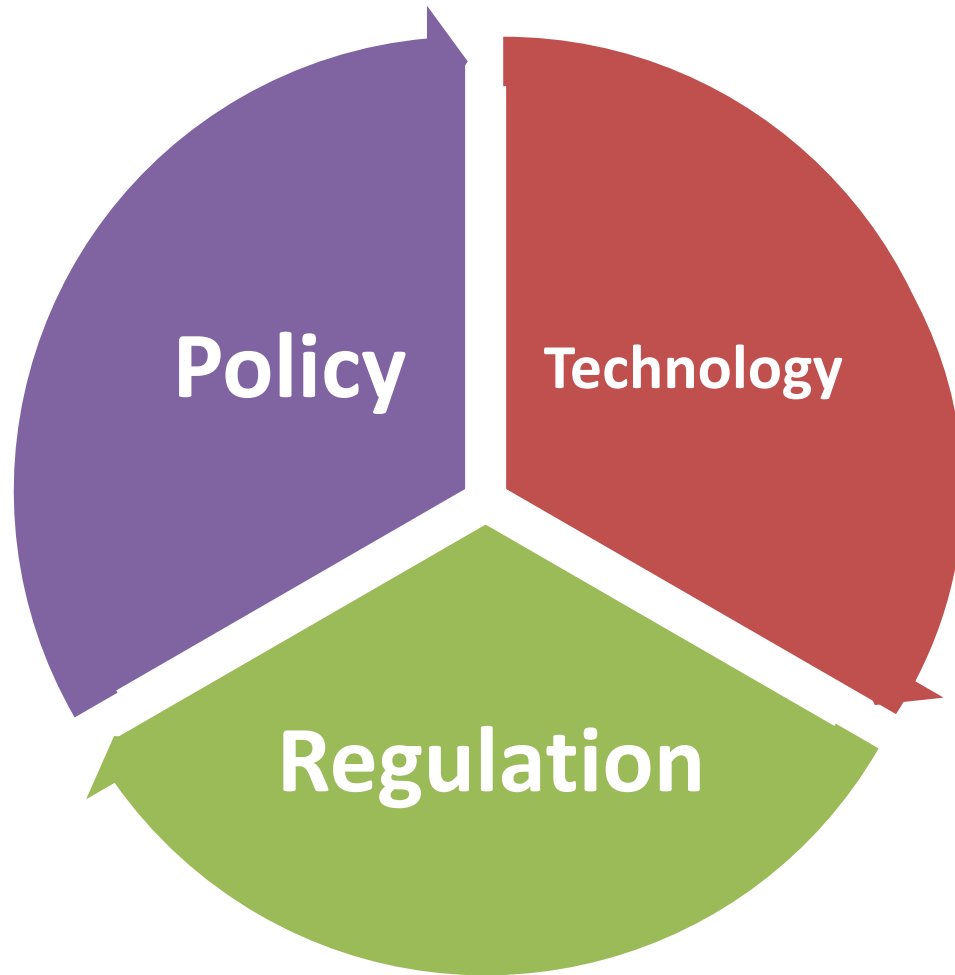
Upper redline

Lower redline

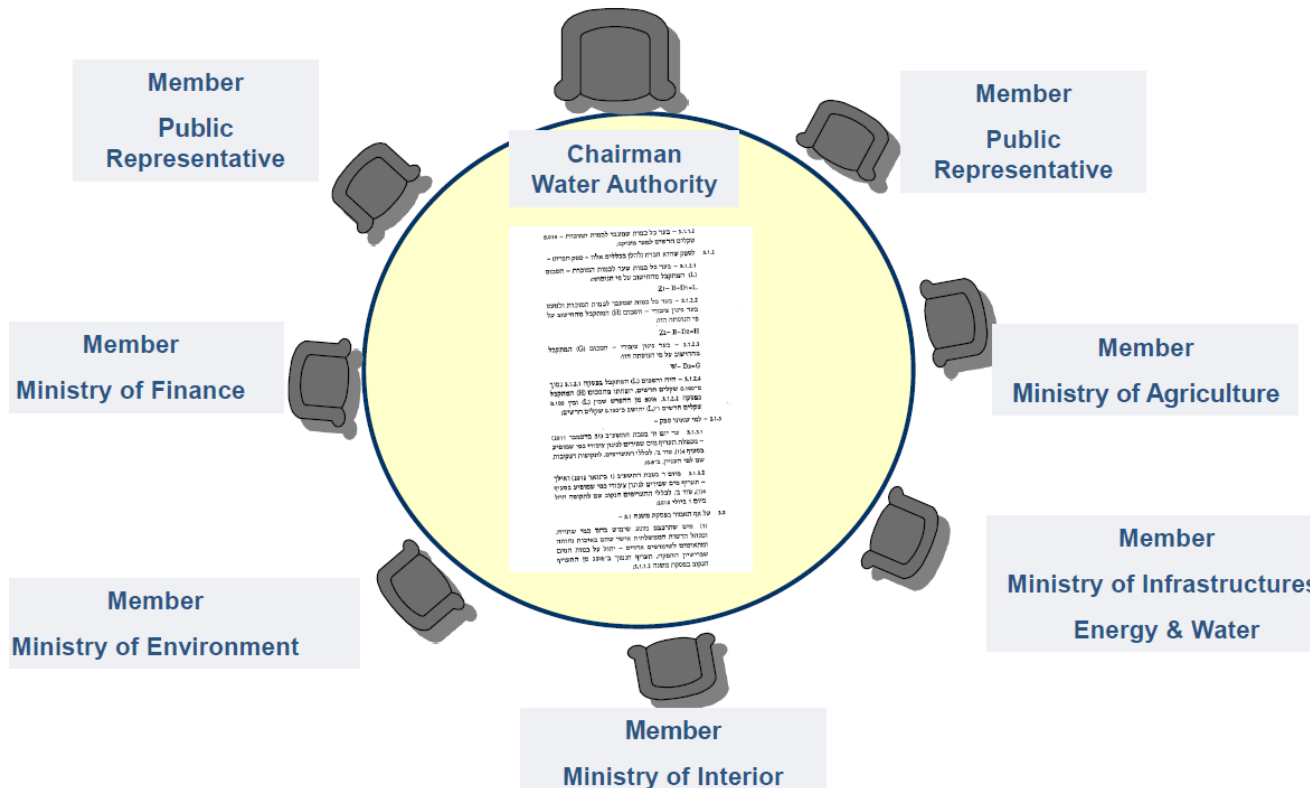
Year

# Solution

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# Water playground

Regulator



Consumers



Suppliers



ISRAEL NATIONAL WATER CO.

55 Municipal Water Companies

1000 local suppliers in the rural sector



Ministry of National Infrastructures,  
Energy and Water Resources

# Reform in water tariffs

The **water tariffs** were raised by approximately 40%.

## Water tariff

- Covers all costs
- Provides the financial resources for investment in water infrastructures
- Fairness and uniformity- All the water users pay the same amount





# Water tariffs for the domestic sector

## Two-block tariff system:

- Below 3.5 m<sup>3</sup>/person/month - the rate is USD 2.3/m<sup>3</sup>
- Above 3.5 m<sup>3</sup>/person/month - the rate is USD 3.7/m<sup>3</sup>

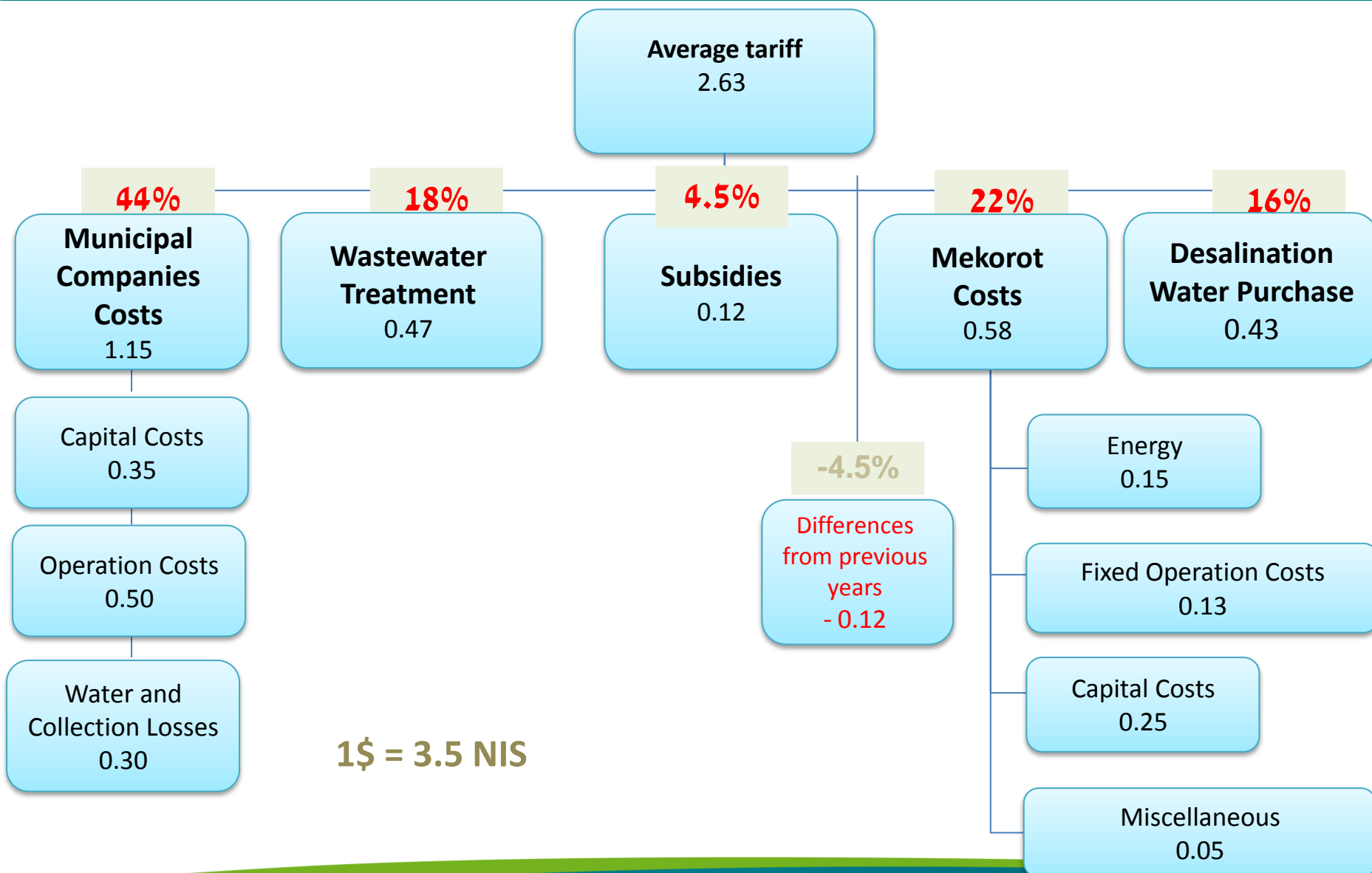
Progressive pricing

Encouraging conservation

Cost recovery

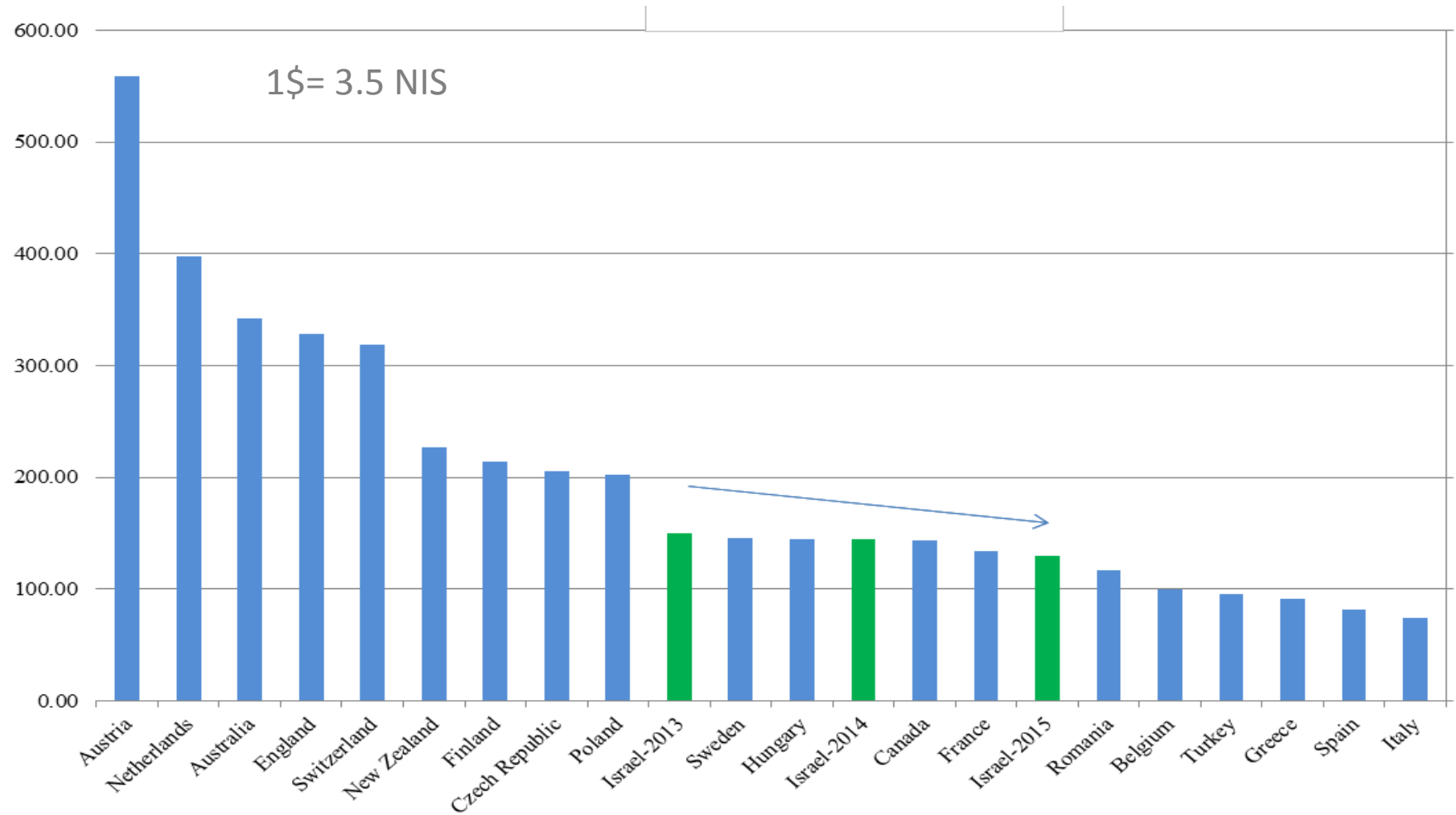


# Water Tariff Components in 2015 (US\$ without VAT)



# Water and Sewage Services tariffs in other countries

Average tariff in NIS per 15 cubic meters in 2014



# Recognized costs of water suppliers

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- **The Goal** – creating a “transparent” methodology for analyzing recognized costs that enable efficient supply of water
- Providing resources for infrastructures needed for water supply and defining normative expenses components (& profit) essential for providing services whilst enhancing efficiency
- Creating regulatory environment that encourages the use of efficient water technologies



# Closing the water gap

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- Water saving
- Wastewater Reuse
- Desalination
- Brackish water desalination



# Water Saving in the Urban sector



## Increasing public awareness

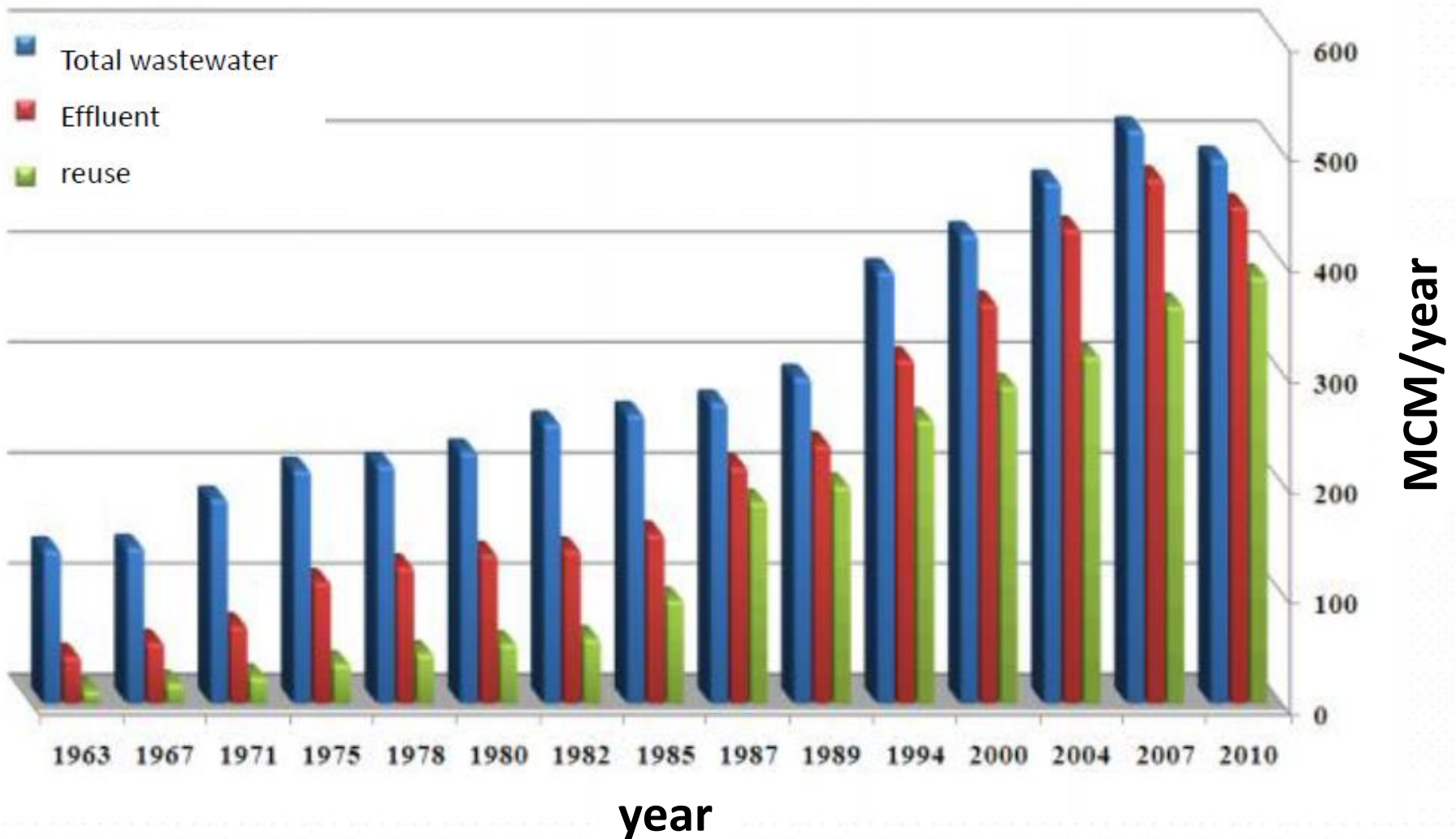


## Installing water saving devices



## Water waving in gardening

# Wastewater Collection, Treatment and Reuse



# Sewage Effluents Reuse

**Reuse of 410 MCM/Y today**

## **Improved Quality:**

- New stringent standards for effluents (37 parameters)
- Tertiary treatment – unrestricted irrigation
- Nutrients and Salt Removal



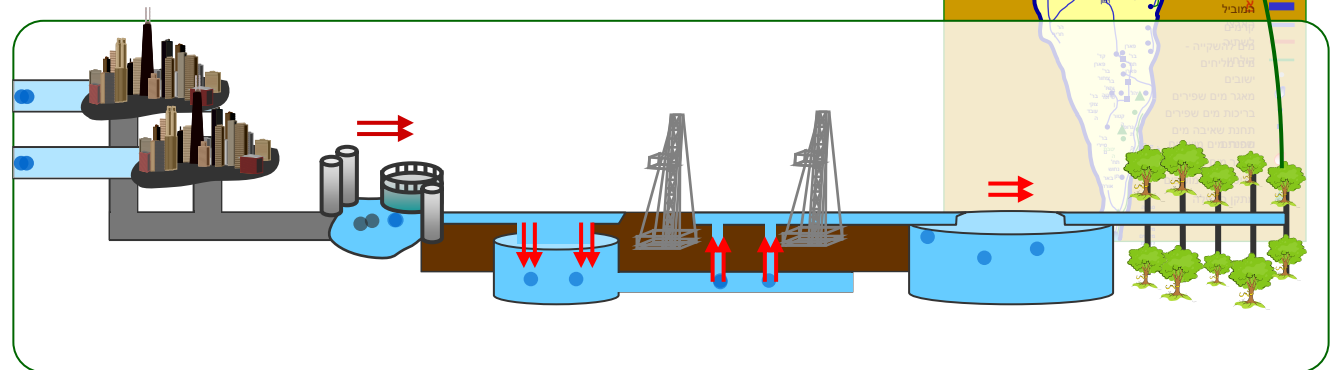
# Regulation

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- Advanced wastewater treatment regulations for tertiary quality (34 parameters), enables non-restricted irrigation (2010)
- Effluent reuse for irrigation (1981)
- Regulations to prevent wastewater contamination (1981-2014)
- ISO –effluent reuse

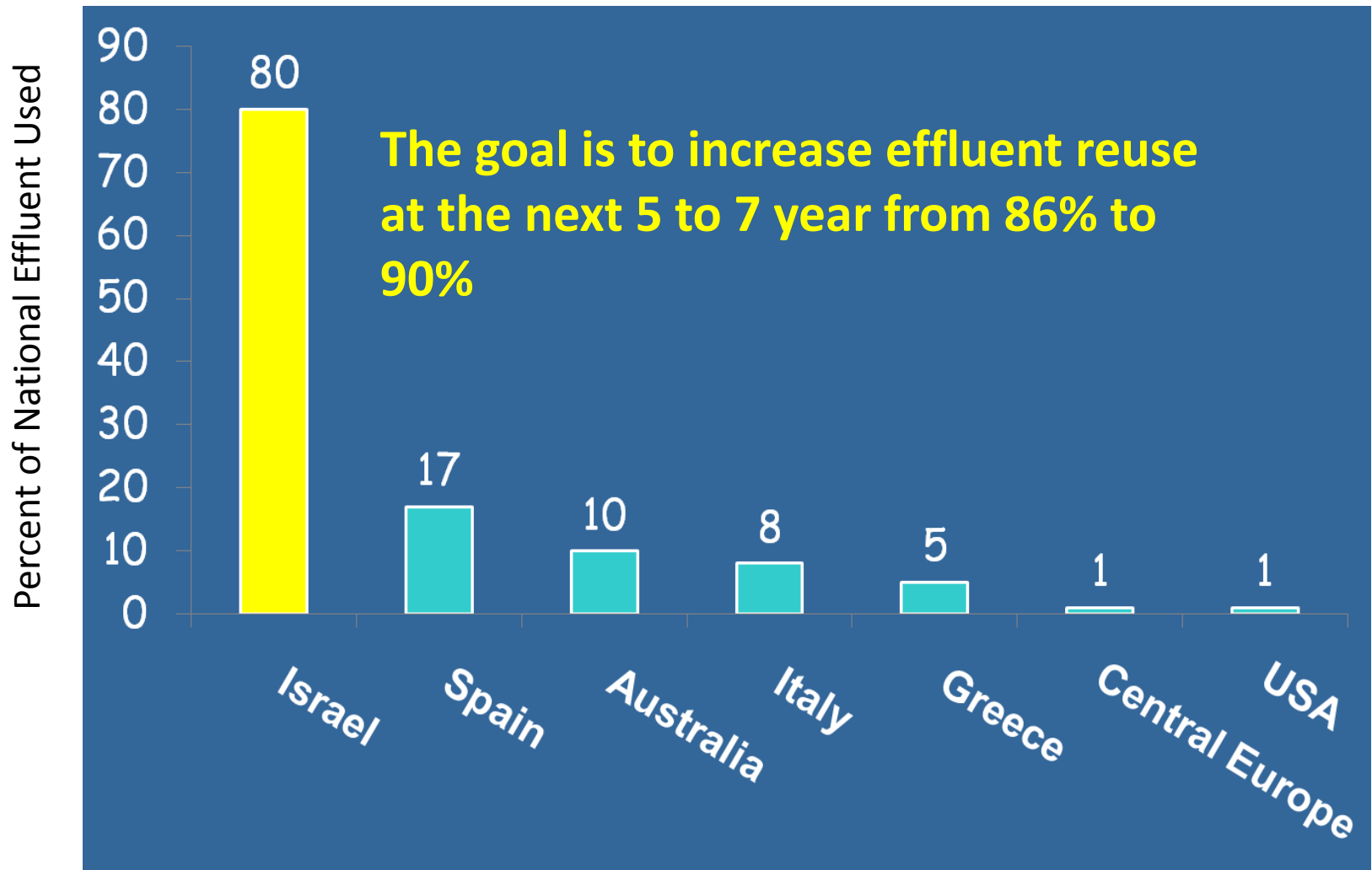
# Sewage Effluents Reuse

- Sewage from the Greater Tel Aviv area– 125 MCM/Y (2010)
- Large-scale WWTP – secondary treatment quality
- Six infiltration fields
- Over 150 production and monitoring wells (quality permitted for “occasional drinking”)
- Diversion of the effluent by 90km pipeline to Negev
- 32 pumping stations, operational storages (0.51MCM) and seasonal storages (17.2 MCM)

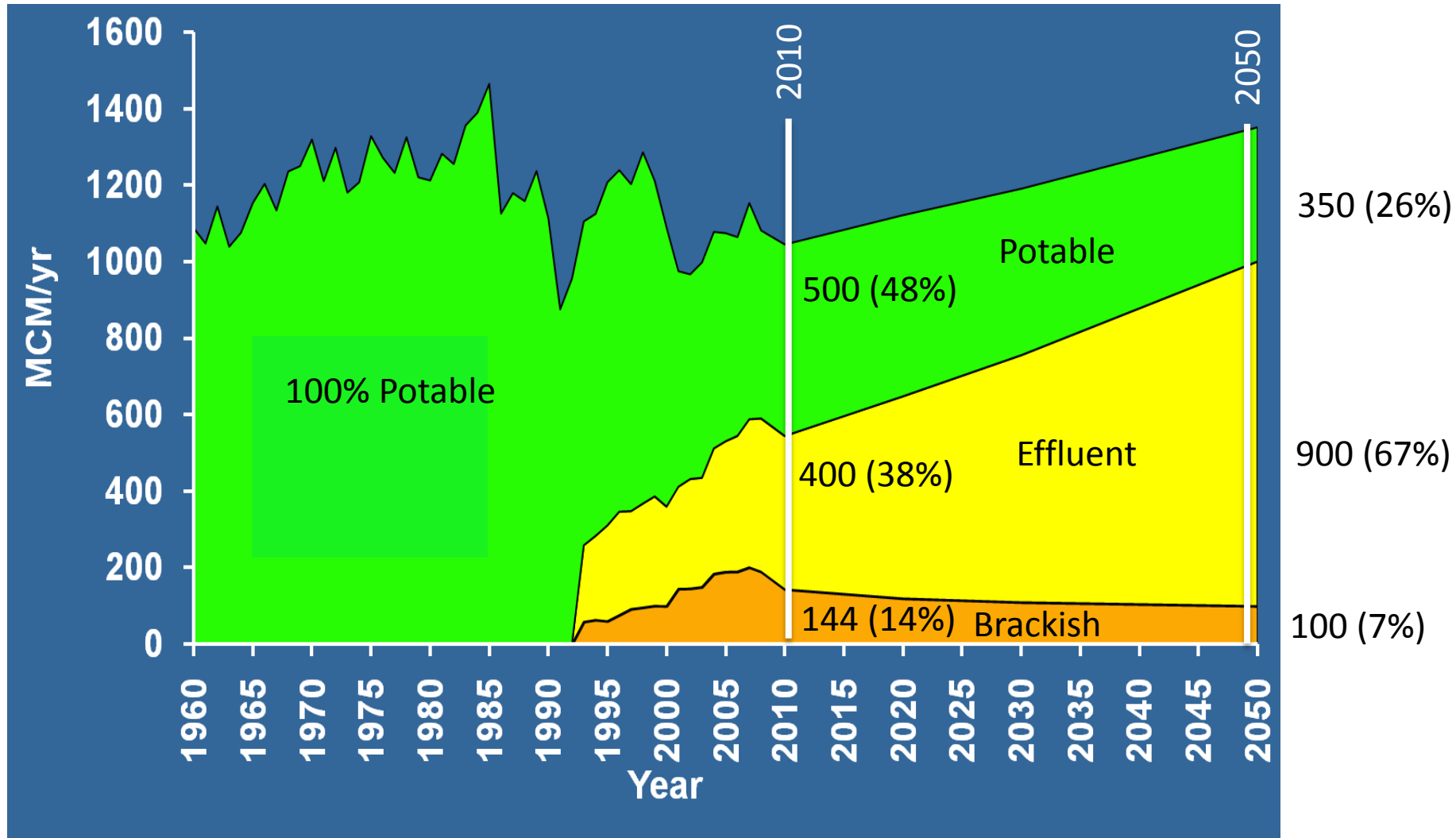




# Effluent reuse in other countries

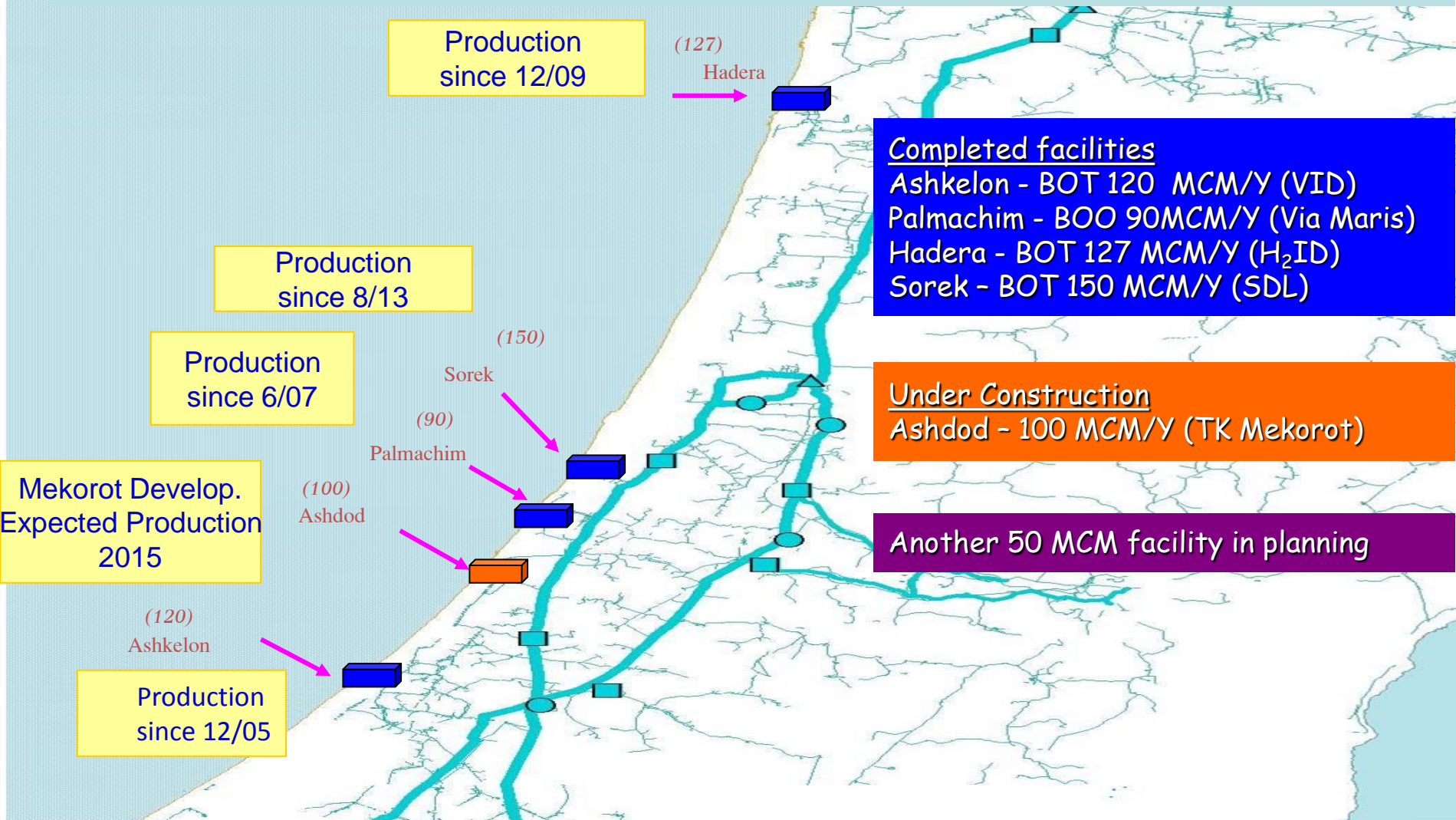


# National Consumption of the Agricultural Sector



# Seawater Desalination

In accordance with the Government decisions since 2001 large scale seawater desalination facilities are being built:

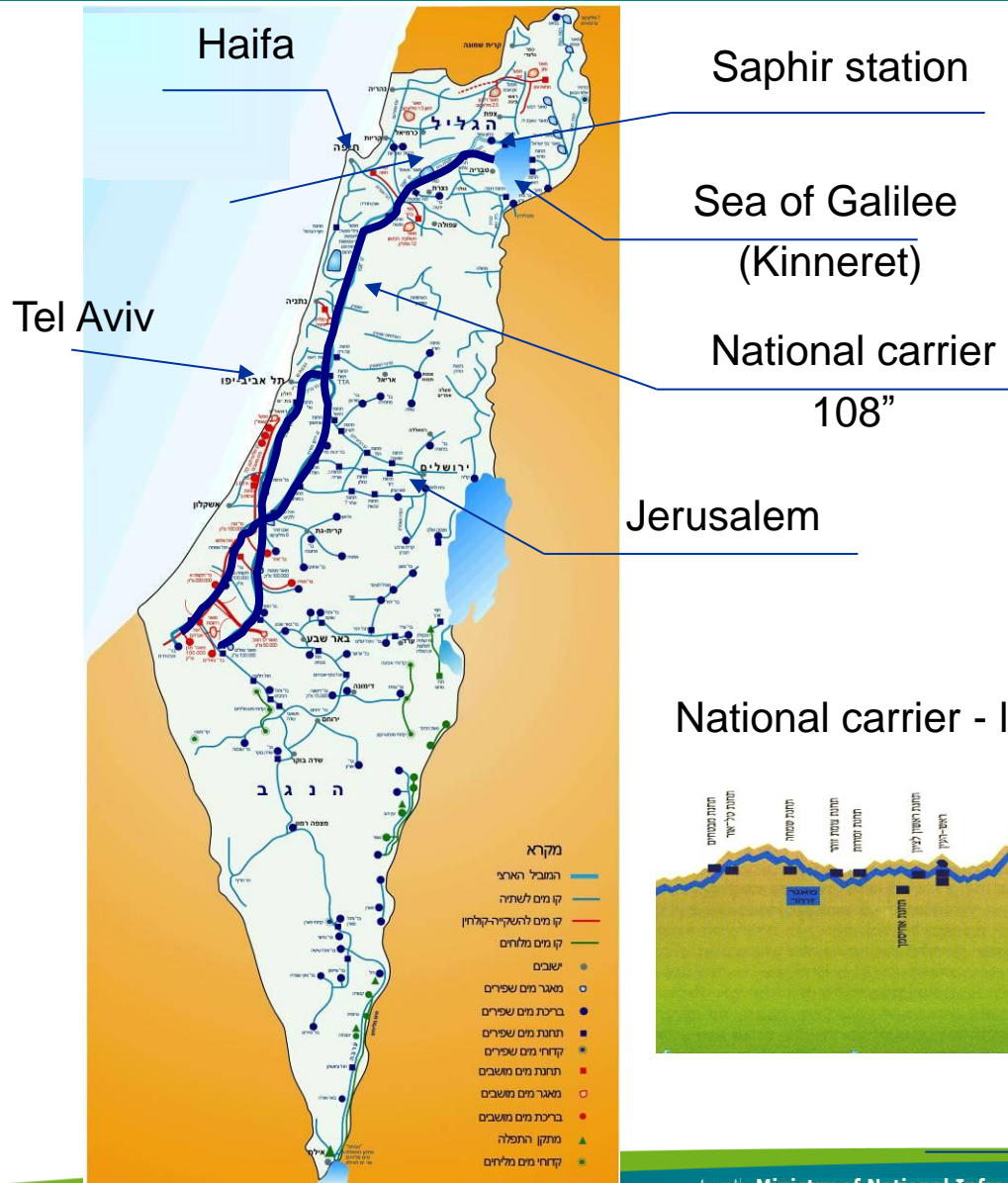


# Desalinized water- Game Changer

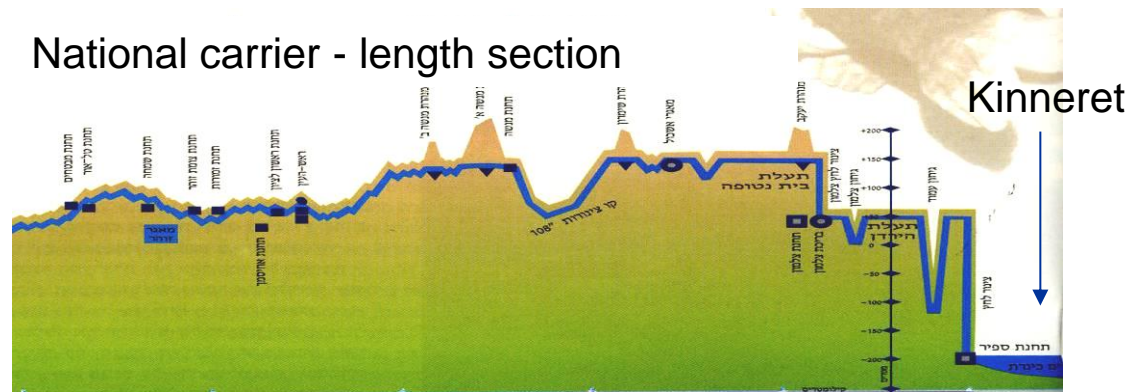


- Water Management: Enlarge or reduce the quantities of desalinated water production in accordance with the annual water balance requirements
- Long term water management at a national level
- Improved quality of potable water and sewage
- Development of the national and regional infrastructure

# The National Water Carrier

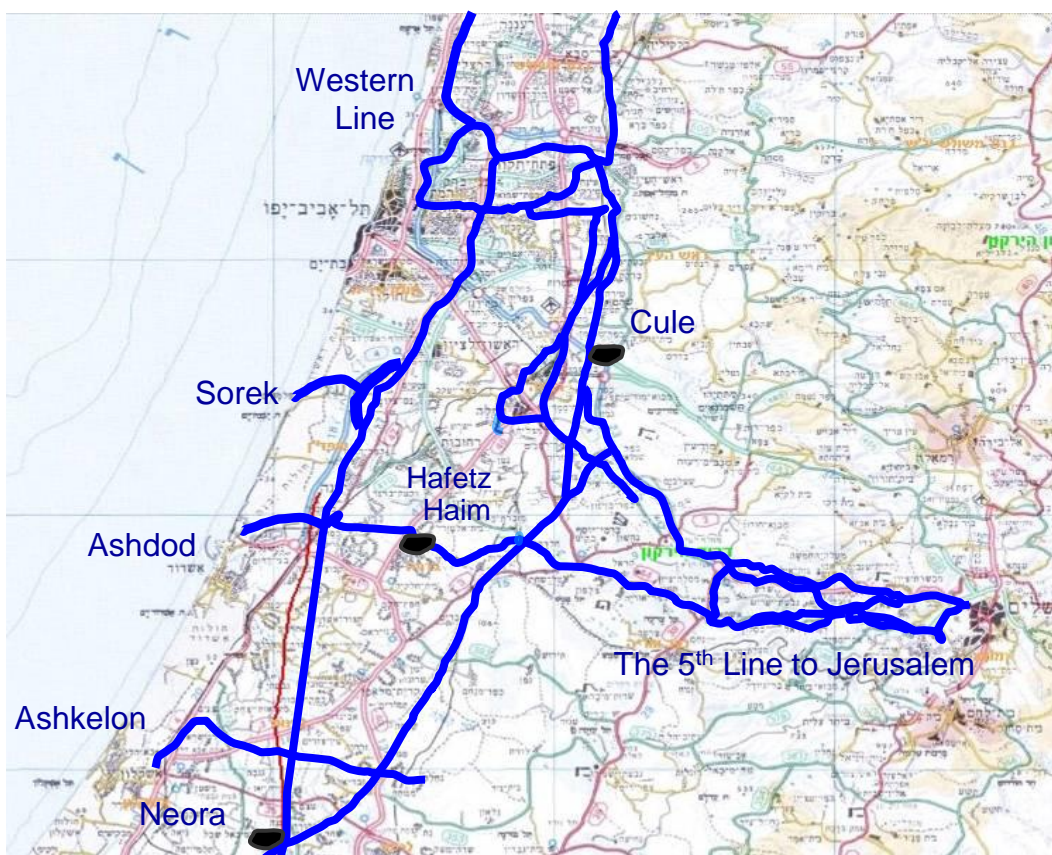


National carrier - length section





# Revolution in the National System Operation



# long term Master plan

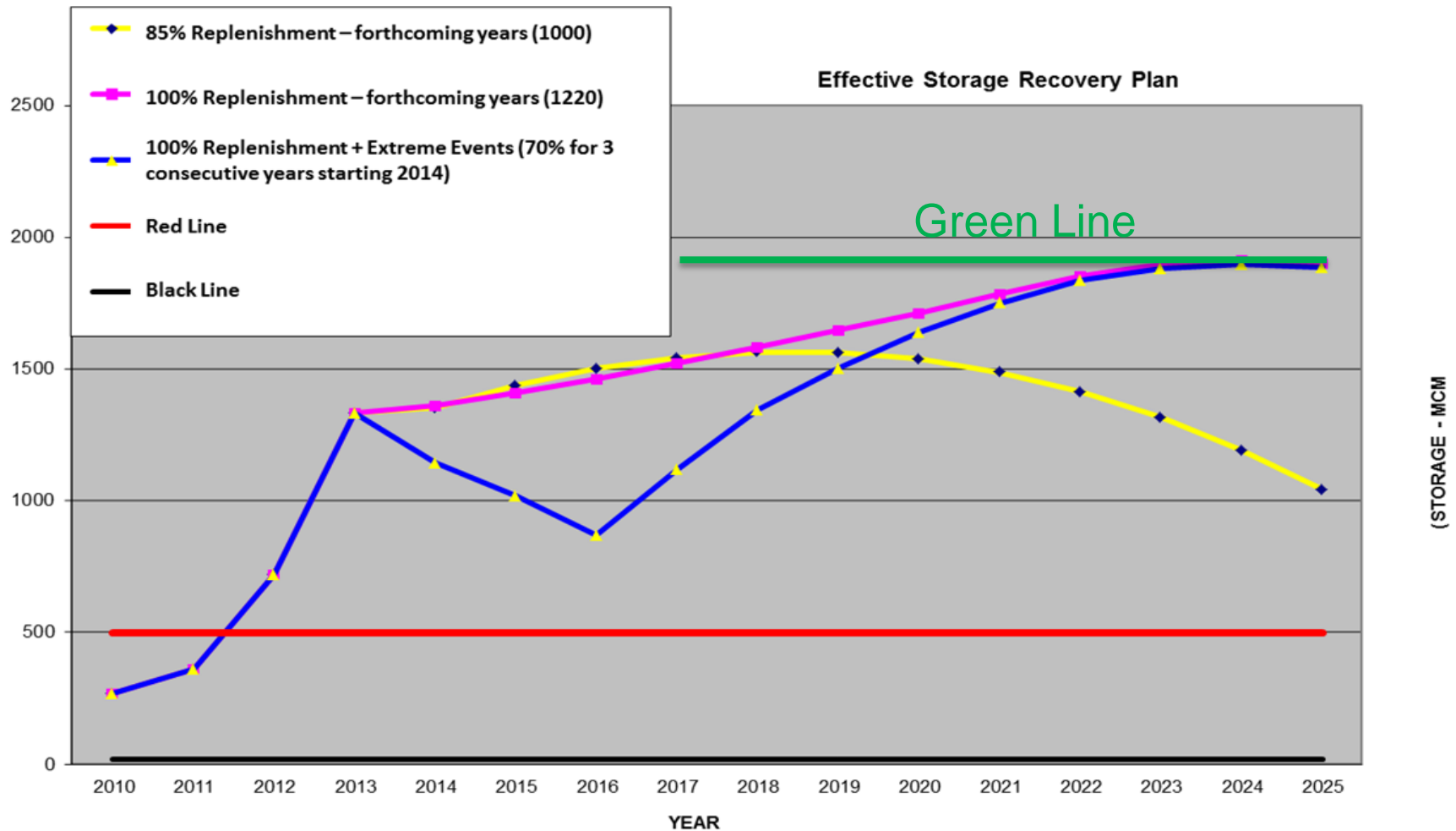
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Takes into account:

- Population growth rate and its distribution
- Consumption rate growth resulting from expected increased of living standards
- Water for nature utilization
- Agricultural distribution and water consumption
- Political arrangements



# Water Storage Recovery Plan

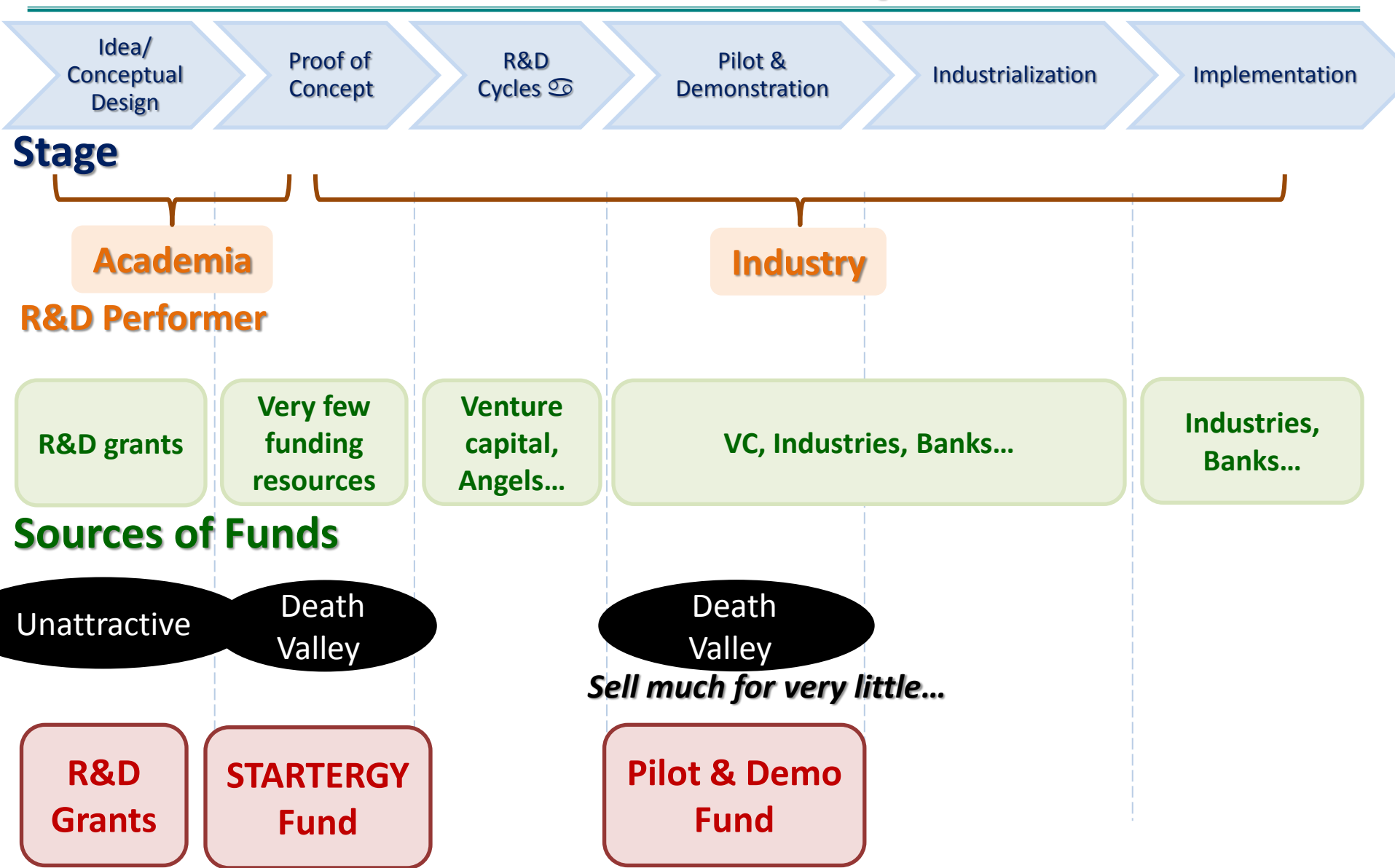


# Innovation and technology challenges

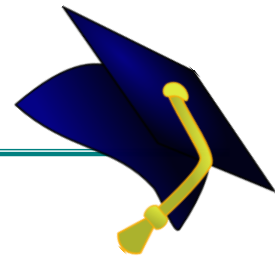
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- Water –Energy Nexus
- Water and wastewater quality/treatment
- Water security
- Water reuse
- New water -desalination
- Management of water systems & events
- Smart cities –smart water system
- Water loss, non revenue water
- Remote/online monitoring
- Sludge treatment

# R&D Roadmap



# Basic Research in the Academia



- Applicable Horizon
- Prioritizing collaborations:
  - International – Academy – Industry
- Graduate Students
- 100% Funding
- Scholarships since 2011:
  - 77 Grants
  - 7.3 Million ILS





# “Startergy” - Pre-seed Industrial Program

- **Proof-of-Concept** of new Ideas
- **Grant - 62.5%** of the project's budget up to **NIS 625K**





# Pilot & Demonstration Industrial Program

- Mature technologies ready for pilot and/or demonstration
- **Grant - 50% of the project's budget up to 1,5M**

Year	Projects	Fund million NIS
2011	2	1
2012	2	1
2013	1	0.8
2014	1	1
<b>Total</b>	<b>6</b>	<b>3.8</b>



# International Collaboration



- Bilateral Funds:
  - US/DoE-Israel: BIRD-Energy, BSF-Energy
  - EU-Israel: JRC
- Memberships in International Organizations
  - IEA-IA (Implementation agreements): PVPS, HIA, AFC, AMF, HTS, ...
  - IRENA
  - EU ERA-NETs, JPI (Joint Programming Initiative), ...



# Thank you Obrigado!



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