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# **The Master Plan for Desalination in Israel , 2020**

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The overall goal of  
the Israeli Water Authority

**Assure that water will be  
sustainable, available, reliable,  
in the required  
quantities, locations and qualities.**

## Water demand forecast (MCM/Year)

Year	2008	2013	2015	2020
Agriculture	430	530	530	530
Industry	85	95	100	110
Urban	730	840	880	980
Aquifer rehabilitation	0	120	130	150
Neighbors	130	130	150	150
Nature	7	50	50	50
Total demand	1,382	1,765	1,840	1,970

These figures do not include effluents, storm water and brackish water for irrigation in the amount of 500 MCM/Year.

## Water resources including desalination (MCM/Year)

Year	2008	2013	2015	2020
Natural resources	675	1,170	1,170	1,170
Brackish water desalination	30	50	70	70
Sea water desalination	140	585	600	750
Total resources	845	1,805	1,840	1,990
Total demand	1,382	1,765	1,840	1,970
Gap	+537	-40	0	-20

These figures do not include effluents, storm water and brackish water for irrigation in the amount of 500 MCM/Year.

**Because we don't share Mose's abilities  
to draw water from the rock...**



Moses Drawing Water from the Rock  
Zabbar Parish Church



# CLOSING THE GAP

- ❖ Water saving and efficient use of water.
- ❖ Water tariffs.
- ❖ Water wells purification and aquifers water quality improvement.
- ❖ Increasing capacity of waste water treatment and upgrading effluent quality.
- ❖ Desalination.

# REDUCING WATER DEMAND

## Water saving and efficient use of water

- Media publications.
- Teaching activities in schools in all levels.
- Water leakage in piping (developing new technologies).
- Using water saving plantation (including new developments).
- Advanced irrigation systems (including new developments and improvements).
- Increasing water price .

# REDUCING WATER DEMAND

## Water Tariffs.

**Real water tariffs is the basis for a sustainable water infrastructure**

- **Urban and Industrial Tariffs.**
- **Agriculture Water and Effluent Tariffs.**
- **Neighbors Tariffs.**

# Resources for increasing water supply (cont')

## Water wells purification and aquifers water quality improvement.

- Assisting in developing technologies for purifying wells
- Funding well purification projects.
- Operating wells on the eastern and western parts of the shore aquifer.

## Resources for increasing water supply (cont')



### Increasing capacity of waste water treatment and upgrading effluent quality.

- Increasing effluent upgrading to a level of tertiary treatment for unlimited irrigation.
- Increasing construction of new water reuse systems.
- Encouraging more farmers to irrigate with effluent instead of fresh water.

# Resources for increasing water supply (cont')

## Brackish water Desalination

- Increasing existing BWRO plants.
- Encouraging construction of new BWRO plants.
- Encouraging technology improvements for BWRO plants.

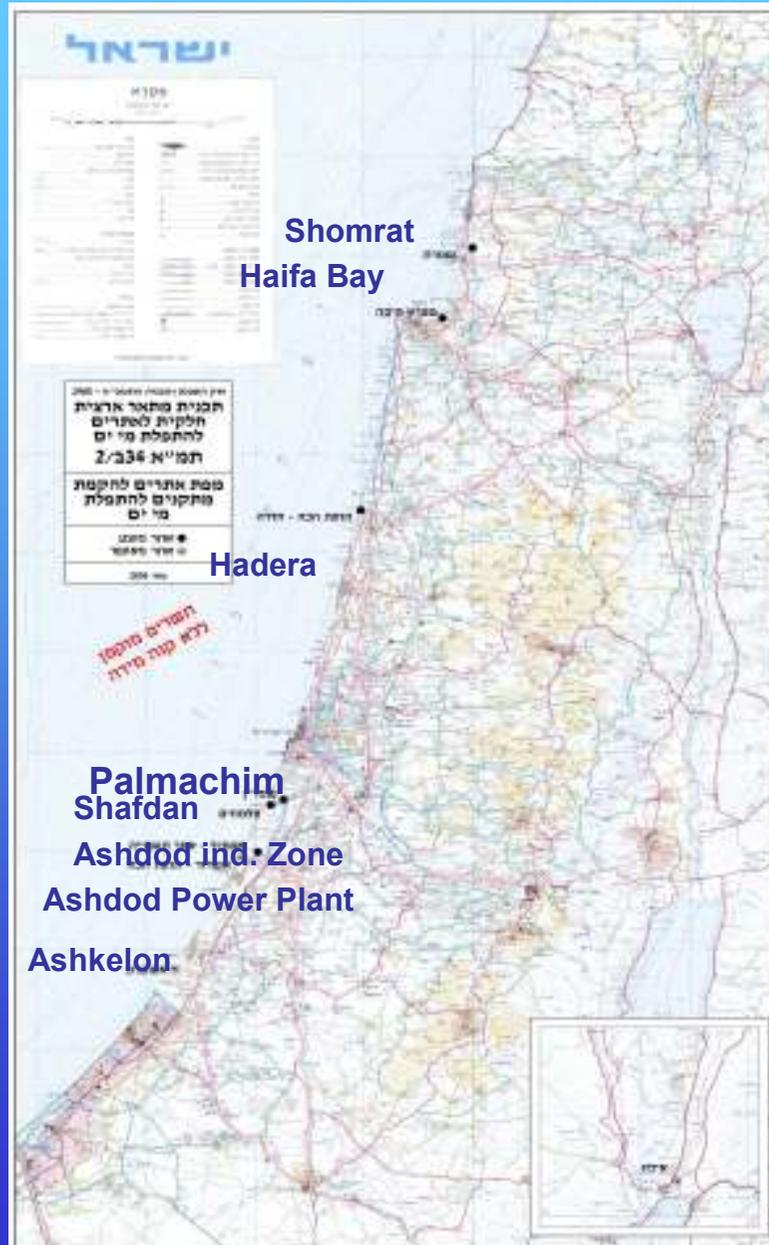
# Resources for increasing water supply (cont')

## Sea water Desalination

- Increasing existing SWRO plants.
- Encouraging construction of new SWRO plants.
- Encouraging technology improvements for SWRO plants in Pretreatment and Post Treatment.
- Encouraging Energy Saving Technology improvements for SWRO plants.

**National Plan 34/b/2**

**For desalination of 755 MCM/Year**



Capacity MCM/Year	Project Location
30	Shomrat
30	Haifa Bay
100	Hadera Power plant
200	Sorek
100	Palmachim
150	Asdod Industrial zone
45	Ashdod power plant
100	Ashkelon
20	Eilat

# Agreements with Desalination Companies

- BOT
- BOO
- Regulations (Future)

**Water Desalination Prices**  
**US\$ Per CM**  
(VAT not included)

<b>Project name</b>	<b>Ashkelon</b>	<b>Palmachim</b>	<b>Hadera</b>	<b>Sorek</b>
<b>Fixed price</b>	<b>0.4</b>	<b>0.35</b>	<b>0.25</b>	<b>0.25</b>
<b>Variable price</b>	<b>0.3</b>	<b>0.45</b>	<b>0.4</b>	<b>0.27</b>
<b>Total price</b>	<b>0.7</b>	<b>0.8</b>	<b>0.65</b>	<b>0.52</b>

## Water Tariffs

sector	Drinking water quality		Effluent
	tariff (\$) per CM for first 3.5 CM/Month	Tariff(\$)	Tariff(\$)
Urban	2.5	3.5 (above 3.5 CM)	
Industry		3.5	
agriculture		0.7	0.4
neighbors		0.04-0.4	

# Desalination Water Quality



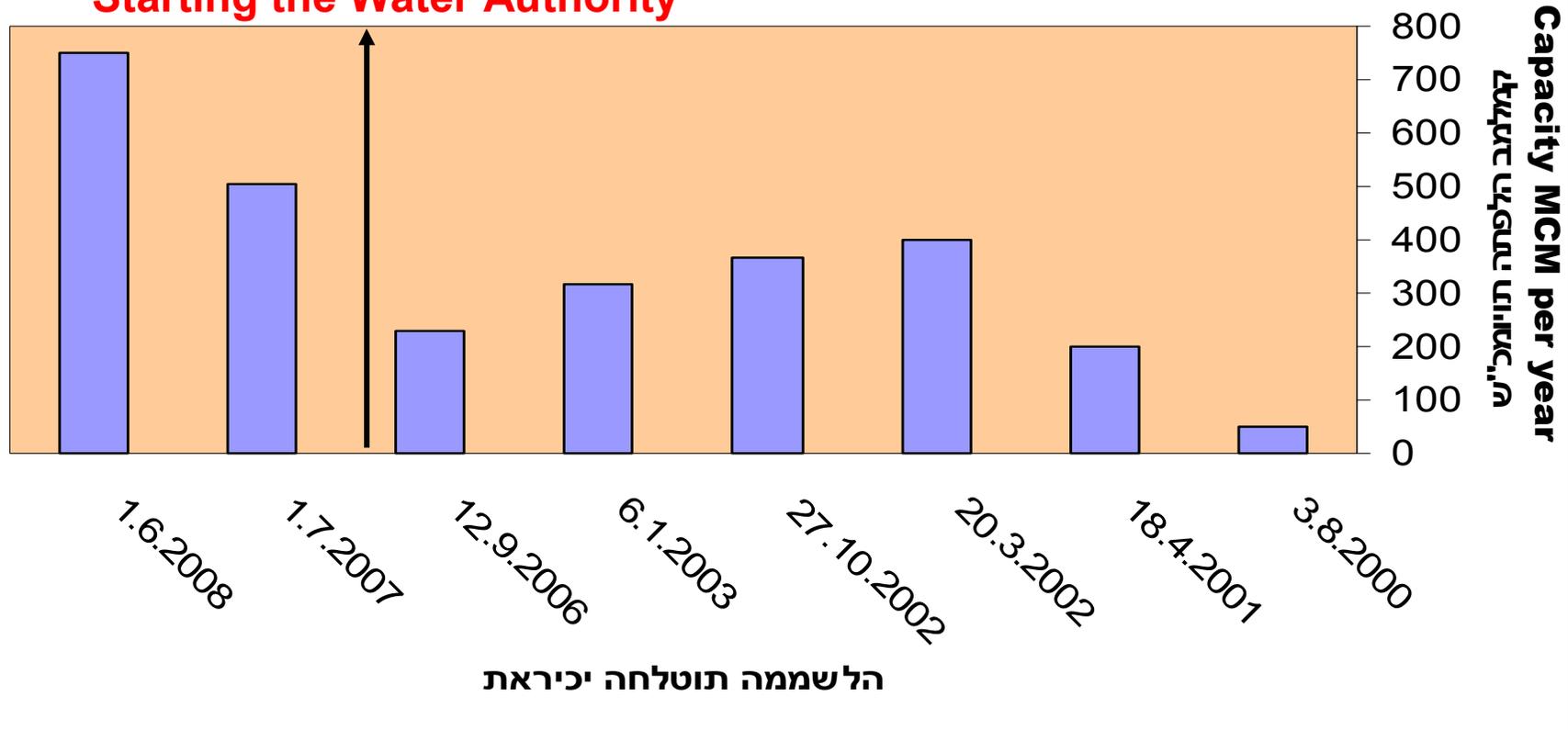
Quality parameter	units	Contractual Demands			Ashkelon Actual	Palmachim Actual	Hadera Actual
		Ashkelon	Palmachim	Hadera			
<b>Chloride</b>	ppm	20	80	20	10-15	30-40	10-15
<b>Boron</b>	ppm	0.4	0.4	0.3	0.2-0.3	0.3-0.38	0.2-0.3
<b>pH</b>	ppm	7.5-8.5	7-8	7.5-8.5	8-8.5	8-8.5	8-8.5
<b>LSI</b>		-0.2 to 0.5	-0.5 to 0.5	0 to 0.5	0 to 0.5	0-0.5	0 to 0.5
<b>Alkalinity</b>	ppm*			>80	45-50	40-45	> 80
<b>Hardness</b>	ppm*	>60	>75	80-120	90-110	85-95	80-120
<b>Turbidity</b>	NTU	<0.5	<0.8	<0.5	0.15-0.2	0.15-0.2	0.15-0.2

\* As CaCO<sub>3</sub>

# Water desalination Outline

**Government Decisions on Desalination capacities**  
**מי ימ תלפתה יפקיהל הלשממ תוטלחה**

**Starting the Water Authority**



הלשממה תוטלחה יכיראת

**Government decisions dates**

### Index

- Operation stage ●
- Construction stage ●
- Pre tender stage ●
- Pre contract stage ●

Water supply	Agreement method	Capacity MCM/Year	Location
August 2005	BOT	100	Ashkelon
May 2007	BOO	30	Palmachim
2013	BOT	150	Sorek
2013	מקורות -TK	100	Ashdod
December 2009	BOT	100	Hadera
2010-2013		160	Hadera expansions
		650	Total

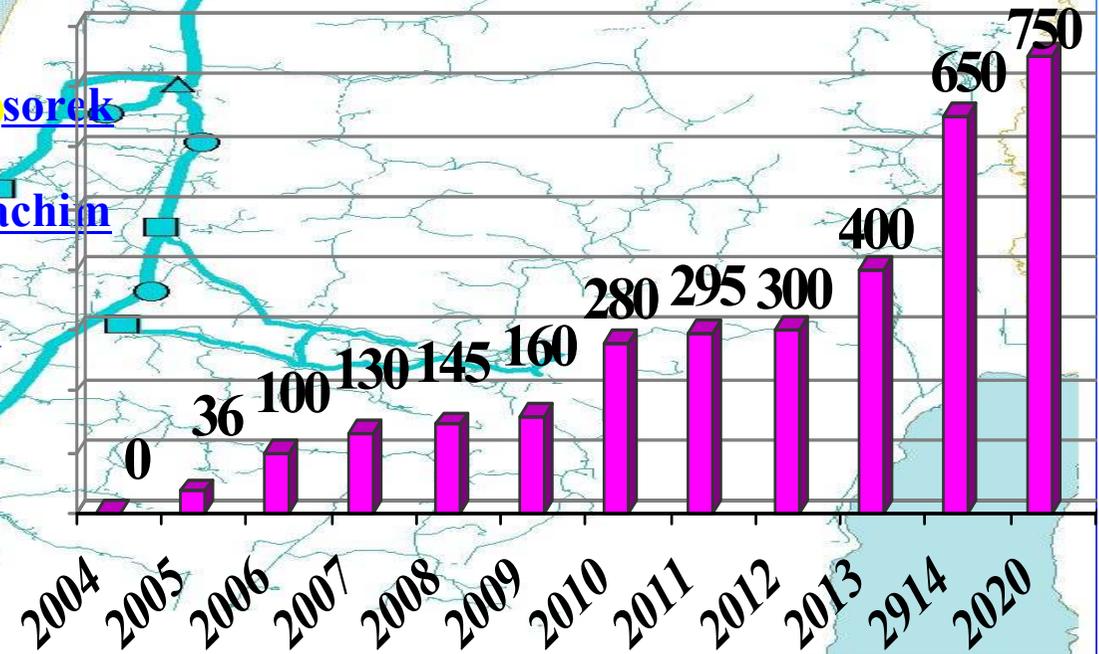
Operation stage 12.2009

Construction stage, water supply 2013

Operation stage 5.2007

Tendering stage, water supply 2013

Operation stage 8.2005



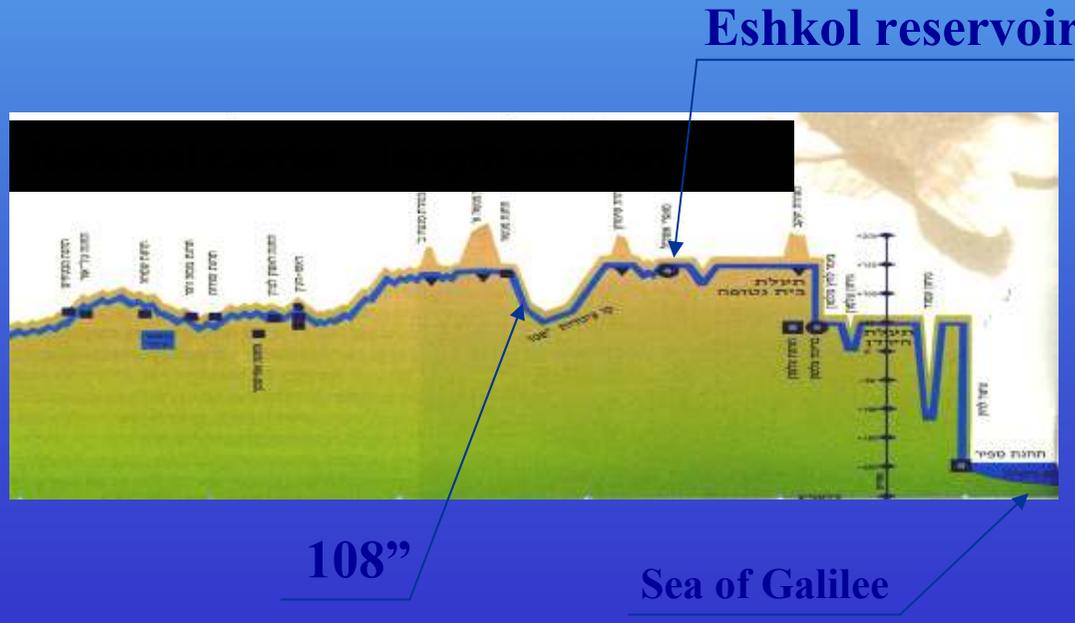
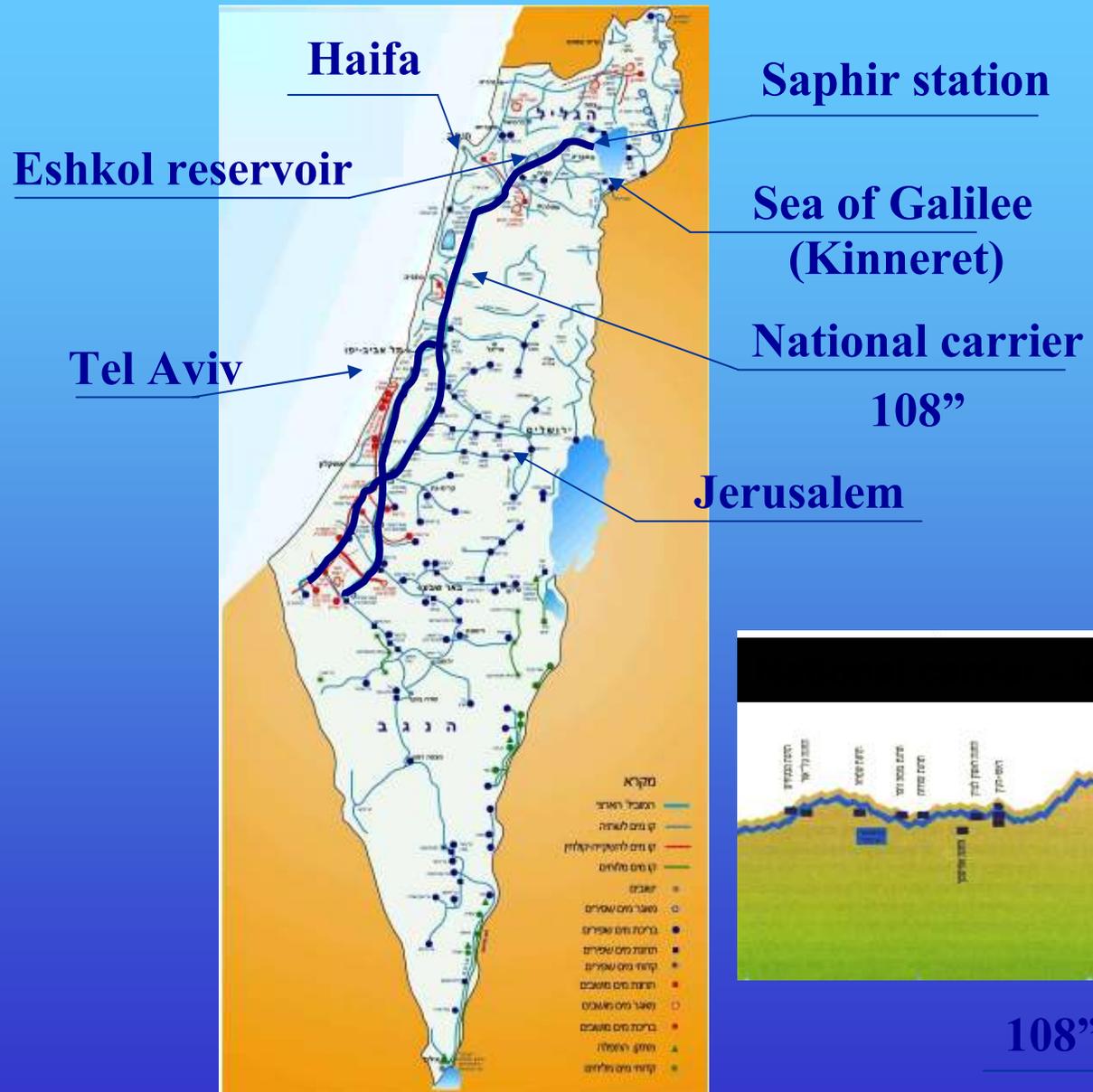
(120) ● Ashkelon

(100) Ashdod

(45) ● Palmachim

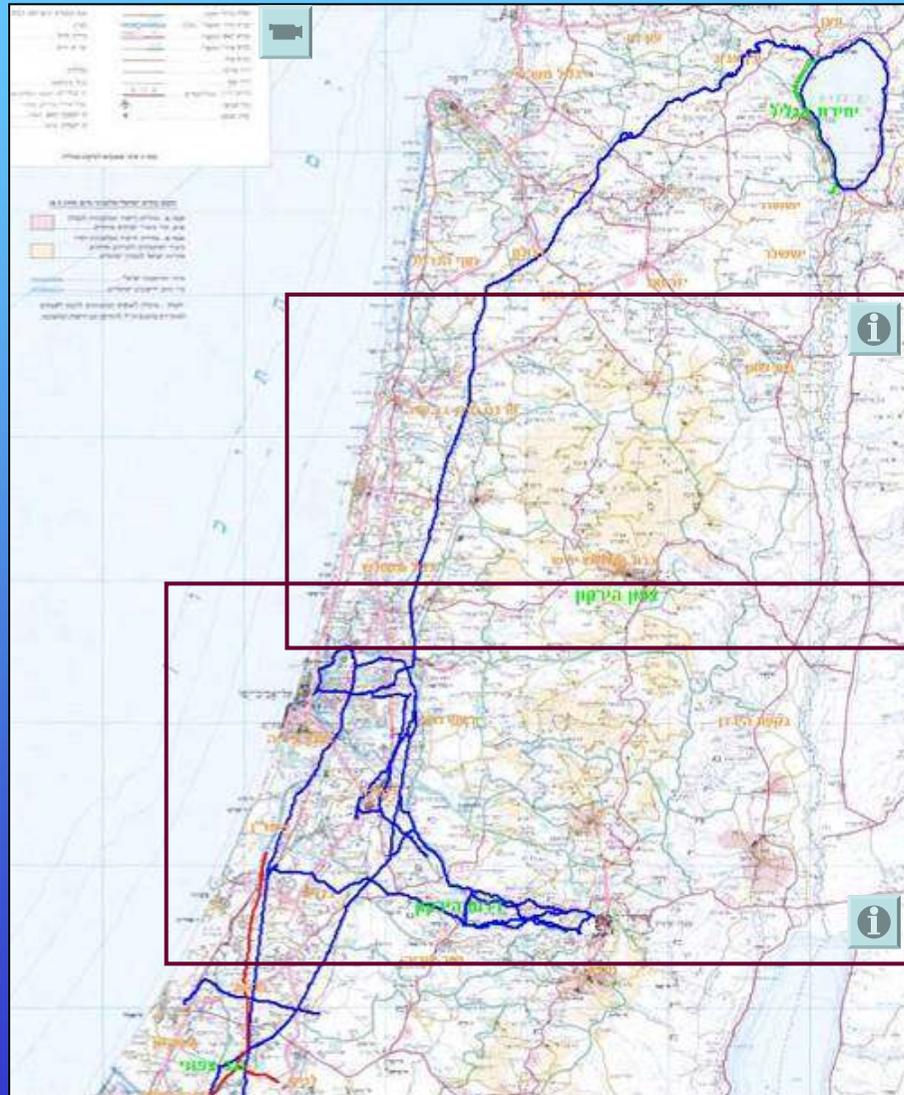
(150) ● Sorek

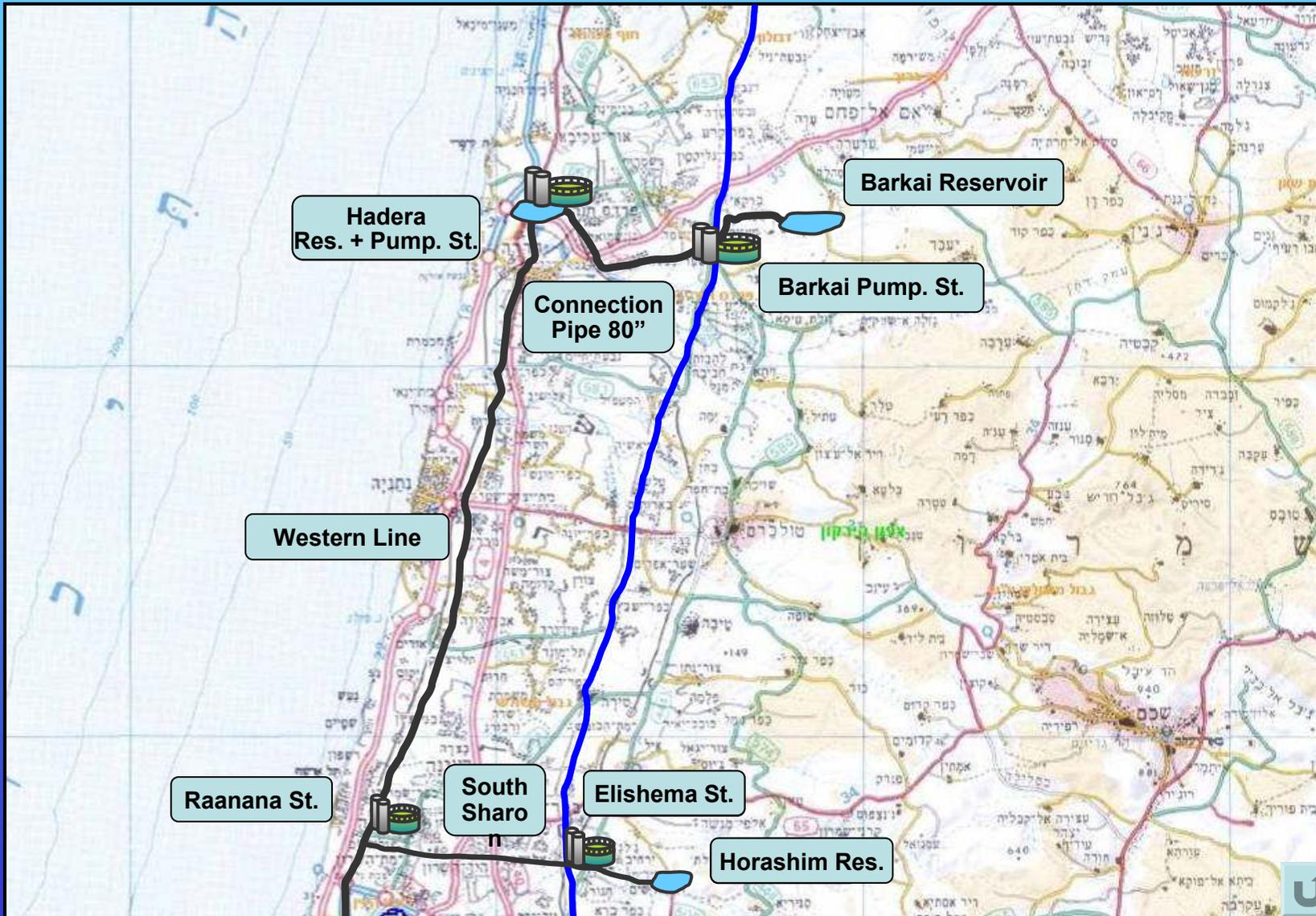
# Main Water Supply System

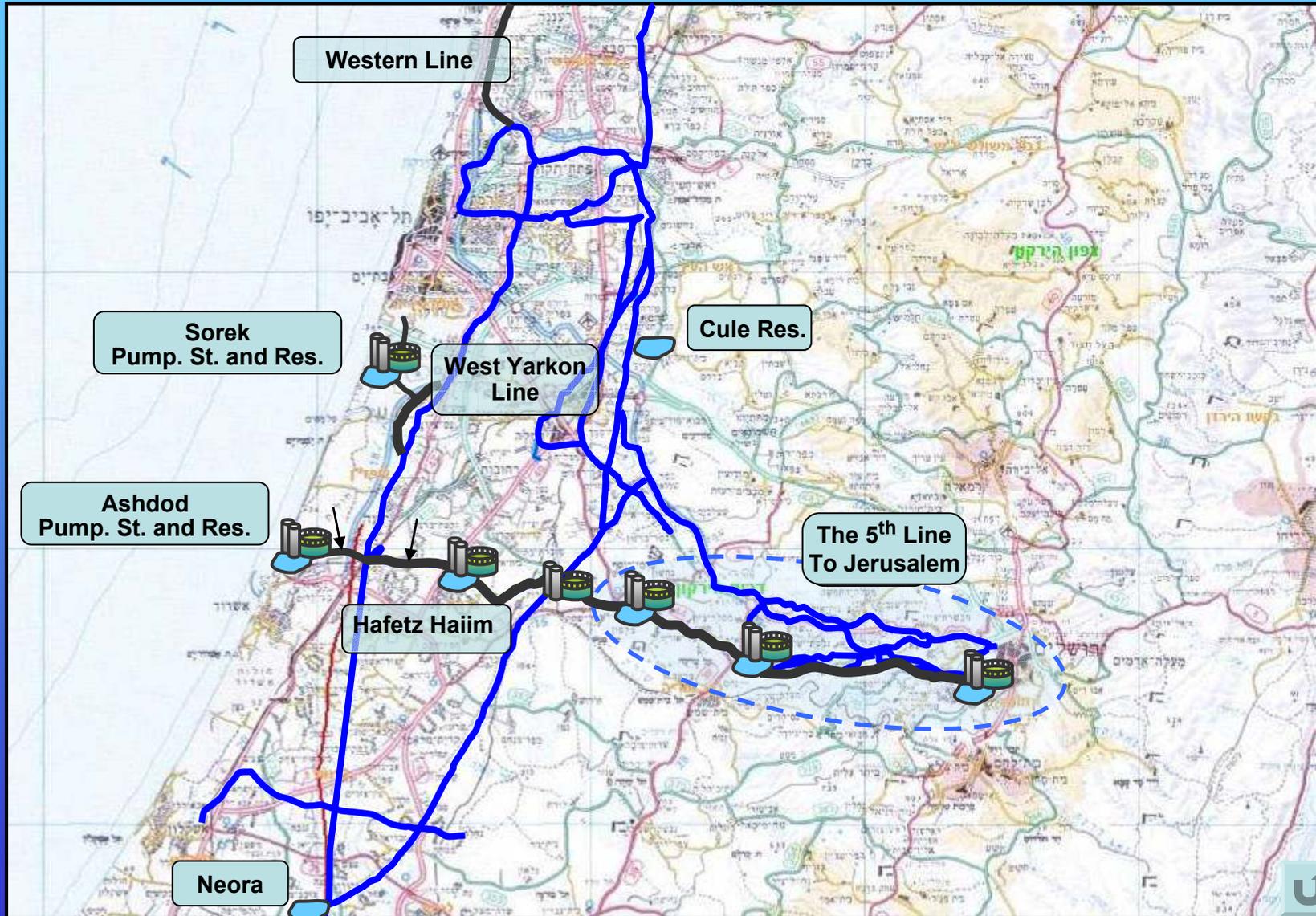




# SWRO facilities connection a revolution in National system operation







# מהפכת משק המים בישראל שינוי תפעול המערכת הארצית



# Energy in Desalination Plants

- **Reduced Specific Energy to 3.5 Kw/CM**
- **Every Desalination Plant will have its own IPP NG.**
- **Solar Panels at the new Desalination plants.**

## New Resources and Renewable Energy

The Israeli Infrastructure ministry had decided to have independent private power plants of a total capacity of 4000-5000 MW in the next 10 years.

<b>NG IPP</b>	<b>2500-3000 MW</b>
<b>Solar Energy</b>	<b>250-500 MW</b>
<b>Wind energy</b>	<b>250-400 MW</b>
<b>Pumped storage</b>	<b>1000-1100 MW</b>

# Renewable Energy

**Solar Energy-** The Israeli Government decided to build two solar power Plants in tow technologies:

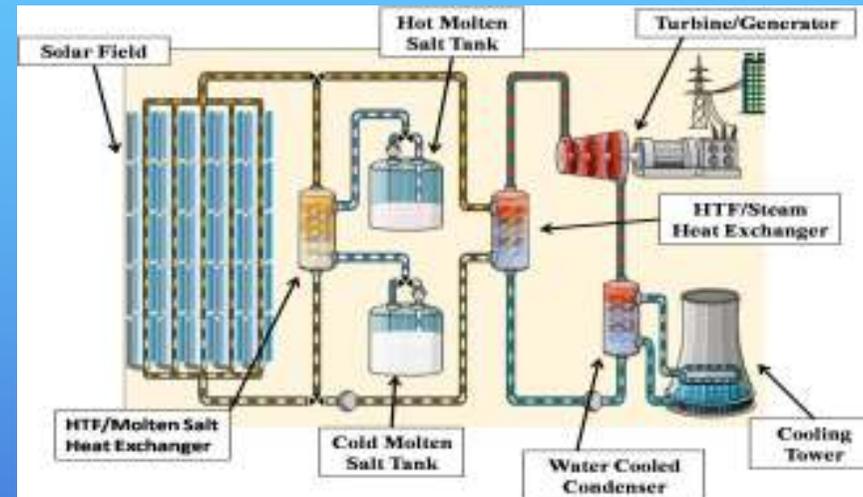
- Solar thermal plants for 80-110 MW
- Photo voltaic plant of 15-30 MW.

The PQ was published at 2009 and the tender will be published in few month.

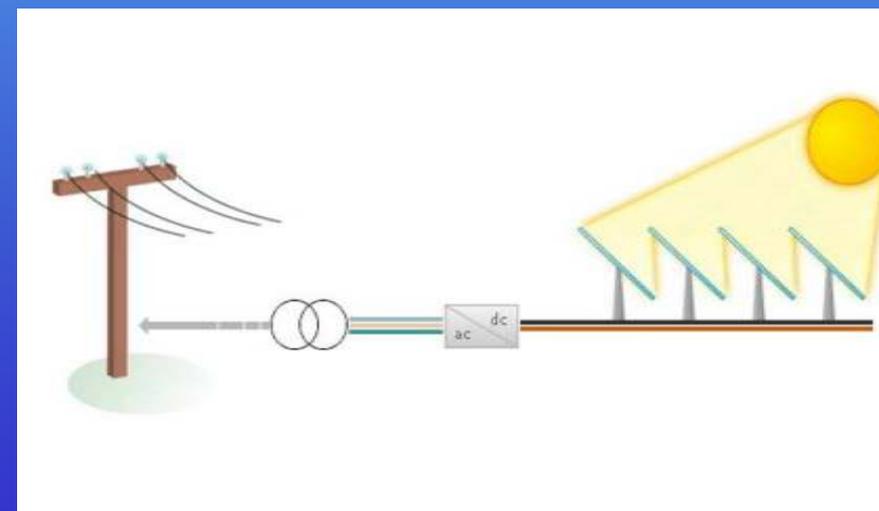
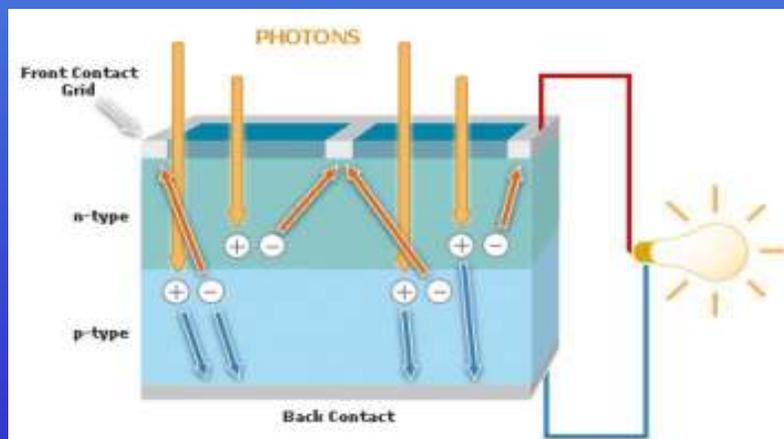
The plants will start its production at 2015.

# Renewable Energy

## Solar thermal plants



## Photo voltaic plants



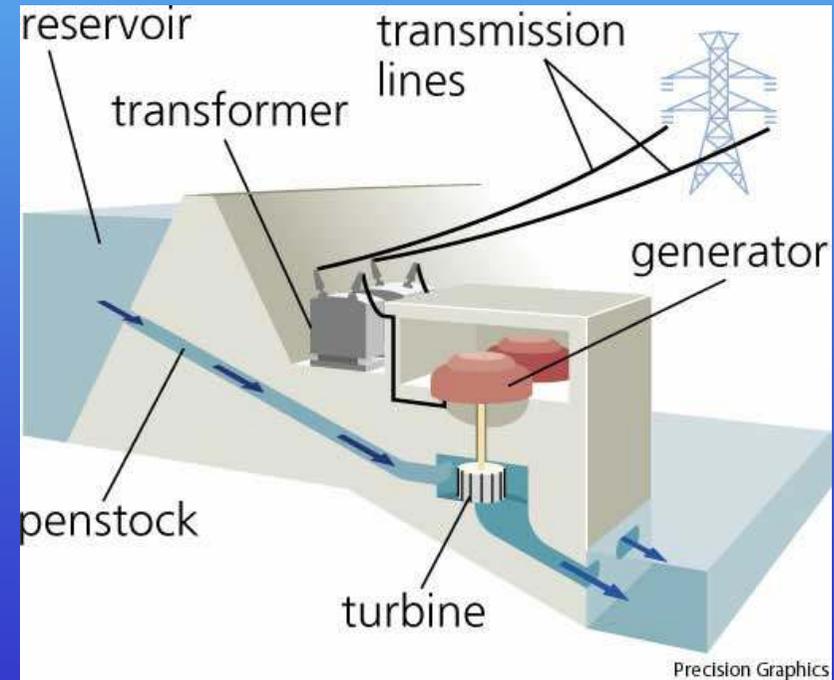
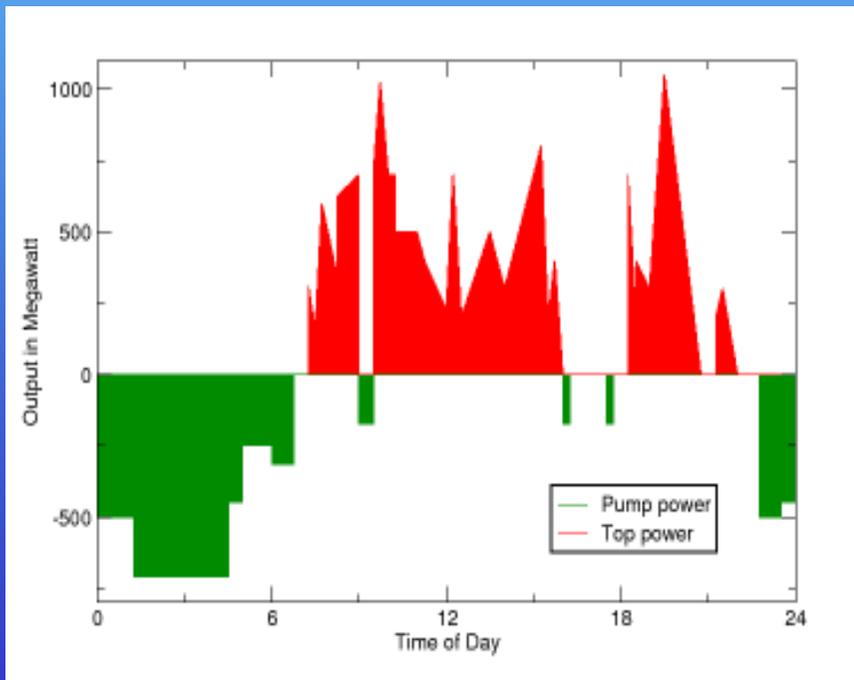
# Renewable Energy

**Wind Energy-** at present we have in Israel a wind turbine farm of 6 MW. The potential is 600 MW.



# Renewable Energy

**Pumped Storage Energy- There are already three approved projects of a total capacity of 700MW.**



# Environmental Aspects

## Concentrate to the sea:

- Advanced defuses
- Monitoring plan

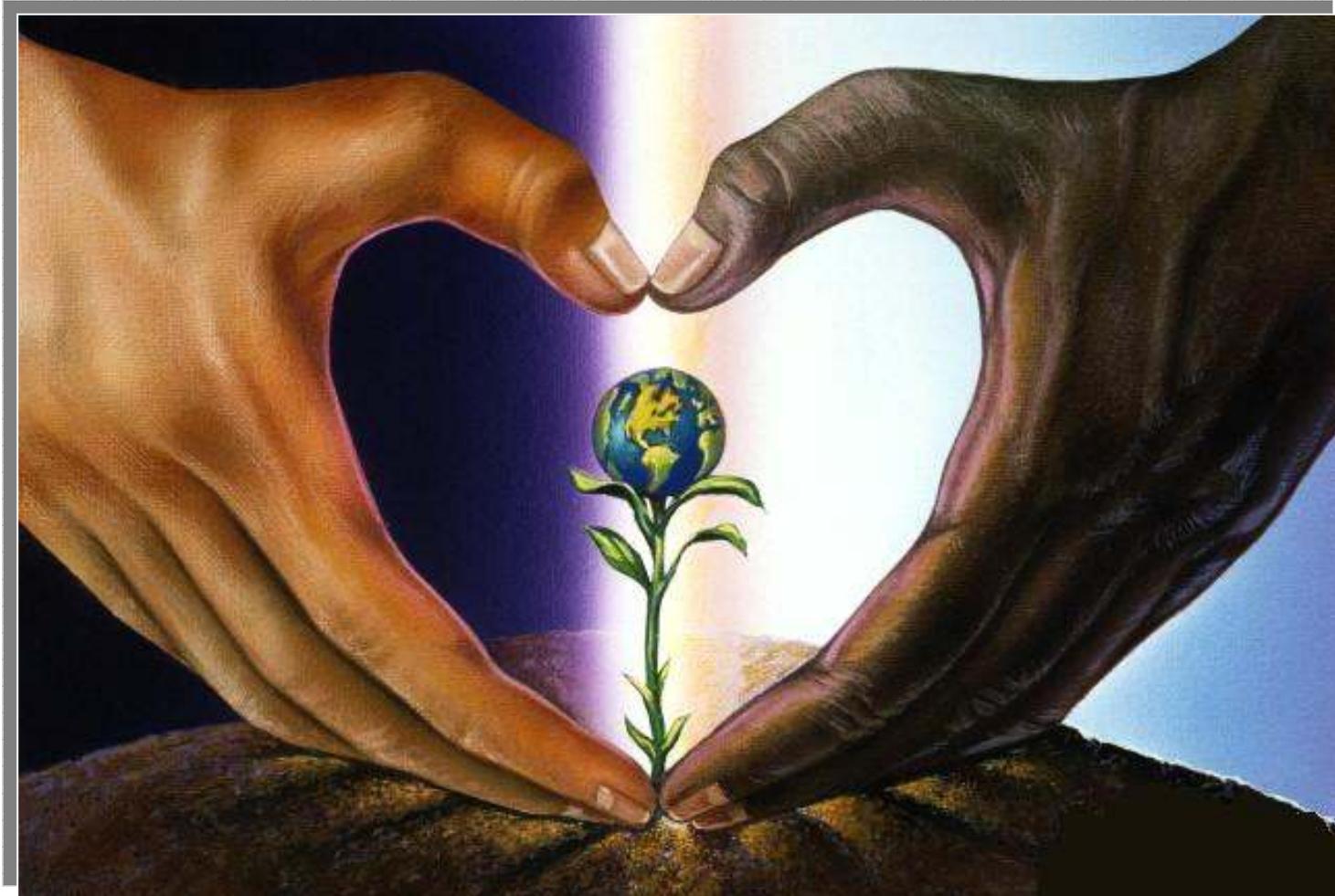
## Coagulants Lead Removal

## Using NG instead coal power plants:

- Impurities reduction of 80%

## Green Chapter in the Desalination Tenders:

- Using local recycled material
- Environmental friendly design



***Thank you***

■ The Governmental Authority for Water and Sewage ■