Desalination and Public-Private Partnership (PPP)

The Israeli Experience

“The Importance of the Colorado River for Arizona’s Future”

June 24th 2008, Phoenix AZ
Countries projected to experience water stress or water scarcity by 2025, UN medium population projection
The World's Water Supply

- Fresh Water Supply
  - 70% Frozen Glaciers
  - 29% Underground Aquifers
  - <1% Lakes, Rivers, Streams

Oceans 97%

Global Water Supply vs. Population

- North America has 15% of the global water supply, but only has 8% of the population. In contrast, China only has 7% of the renewable water supply, but 21% of the population.
- Over one billion people use unsafe drinking water, with 3-4 million people dying each year from waterborne diseases.
- The number of people living in scarce-water conditions globally is expected to double in 20 years, and those in water stressed geographies should increase six times.

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1 Source: Goldman Sachs Research
World Expected Desalination Capacity (m³/day)

- Thermal
- Membrane

5 Year CAGR: 10.0%
10 Year CAGR: 9.3%

Growth Drivers:
- Scarcity of Water
- Global Population Growth
- Industrial Expansion
- Affordability of Different Technologies

Source: Global Water Intelligence
Overview

- Global spending on desalination is estimated at c.$4.3bn in 2005, with the market split 60%-40% between municipalities and industrial users.
- c.56% of installed capacity is in the Middle East.
- Over the next 10 years, the global desalination market is expected to grow between 9-14% annually.
- The largest market will continue to be the Gulf area, where the combination of rapidly growing populations, depleted groundwater resources and the retirement of capacity built during the oil boom years of the 1970s and early 1980s will require a near doubling of the total capacity.
- China and India are also set to enter the large-scale seawater desalination market. Both have large populations in water-stressed regions and political backing for higher water tariffs.

Capacity by Geography

- Middle East: 56%
- North America: 19%
- Asia ex Middle East: 11%
- Europe: 8%
- Africa: 5%
- Other: 1%

Forecast Additional Capacity by 2015

Forecast Global Desalination Capacity

Source: GWI.
- Strong long term demand for water due to Population growth and industrial expansion
- Historical market growth 8% to 10% per year. Expected yearly growth of over 10%
- Increased demand in water scarce countries in the next 25 years
- The sector started a long-term investment cycle in developed and emerging countries

**Market Forecast**

Cumulative Contracted Capacity (in M)
Case Study - ISRAEL
Sea Water Desalination
A Comprehensive Solution for Sustainable Water
Lake Galilee
Regions’ largest Natural Reserve

400M m3 deficit

Over exploited
A matter of National Priority

1950’s-60’s

- Desalination cost 37.85 $/Kgal
- Israel’s National Carrier top National Priority
Desalination Price ~$2.3 Kgal

Desalination becomes the next national priority.
Environmental Benefits

- Improves water quality in national grid.
- Enables dilution with brackish water.
- Reduces over-pumping of Lake Galilee
- Stops salting of Aquifer.
- Frees up Jordan River flow and stops destruction of Dead Sea.
Development of sea water desalination plants in Israel along the national system

Construction (expected online Q4 09)
Production since 6/07
Full production Since 12/05
Political Benefits

- **1953**, Syria tries to stop construction of the National Carrier. Fighting erupts.


- “The Six Day War started because of conflict with Syria on water, starting two and a half years earlier…” Ariel Sharon

- **2002**, conflict between Lebanon & Israel over Lebanon plans to divert the Wazzani.

- “The only reason Jordan might go to war against Israel is over water.” King Hussein, after signing the Peace Treaty with Israel.
The Ashkelon 100 Mm³/year Sea Water Desalination Project (87 MGD)
PPP Contractual Structure

- **BOT Agreement**
- **O&M Contract**
- **EPC Contract**

**OWNER**

- **Sale of desalinated water and transfer of desalination plant upon termination of the Agreement**

**SPC**

- **OPERATOR**
- **CONTRACTOR**
- **LENDERS**
- **SHAREHOLDERS**
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**Contractual Structure**

- **O&M Company**
  - IDE Technologies Ltd.
  - Veolia Water S.A.

- **IEC**

- **EPC Company**
  - IDE Technologies Ltd.
  - OTV

- **VID DESALINATION COMPANY (VID)**
  - Holds and depreciates the Plant
  - IDE 50% Veolia 50%

- **Self Generating Energy Supply System (IPP)**
  - IPP Ashkelon Limited Partnership

- **WDA**
  - Sale of desalinated water and transfer of desalination plant upon termination of the Agreement

- **EPC Company**
  - IDE Technologies Ltd.
  - OTV

- **Limited Recourse Lenders to VID**

- **Limited Recourse to MRD**

- **Financing Agreement(s)**

- **BOT Agreement**

- **Power Supply Contract**

- **Loan Agreement**
Equity fund 23.5% of the total financing requirements

Credit facility provided by lenders fund 76.5% of the total financing requirements (Bank Leumi + 106 Institutional Lenders)

Standby facilities provided by shareholders and by Bank Leumi fund 6% of the total financing requirements
Variable component
Indexed to:
• electricity prices
• CPI (USD and NIS)

Fixed component
Indexed to:
• NIS (min 33%)
• USD

Total Price ~ 53 US¢ / m³
(2.00 $/Kgal)
(at bid stage)

To cover:
• energy costs
• variable O&M costs
• membranes & chemical costs
• profit

To cover:
• capital expenditure
• fixed O&M costs
• profit
The bi-monthly quantities required in the summer months are higher
- design of plant to facilitate this requirement

Tolerance band of +/- 8%
- LDs payable for delivery less than 92% of requirements
- additional agreement with WDA required for quantities in excess of 108%

Payments are weighted towards meeting short-term goals:
- Daily: 50% of capacity payment
- Bimonthly: 40% of capacity payment
- Annual: 10% of capacity payment
Difficulties & Solutions

Timetable

😊 achieve all permits in time for construction commencement

😊 Detailed design start upon Award

😊 National and Regional permits by Government/WDA experts during Bid Stage.

😊 Building permits by SPC/EPC experts
• Financing

😊 securing long term (local) debt in time for financial close

😢 lack of Project Finance local precedents in the field of desalination

😊 securing support of Arranger/Lender and candidates for Syndication starting at Bid Stage (incl. “technical education”)
Ashkelon SWRO 330,000 m³/d (87 MGD)

25 years BOT project; built on time & on budget; 2nd year of successful operation
Hadera SWRO 330,000 m$^3$/d (87 MGD)

25 years BOT project; under development
Larnaca, Cyprus SWRO – 54,000 cu.m/d

10 years BOT project; under 6th year of successful operation
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June 24, 2008
Phoenix, Arizona