

# Desalination Opportunities in the Middle East, North Africa and India



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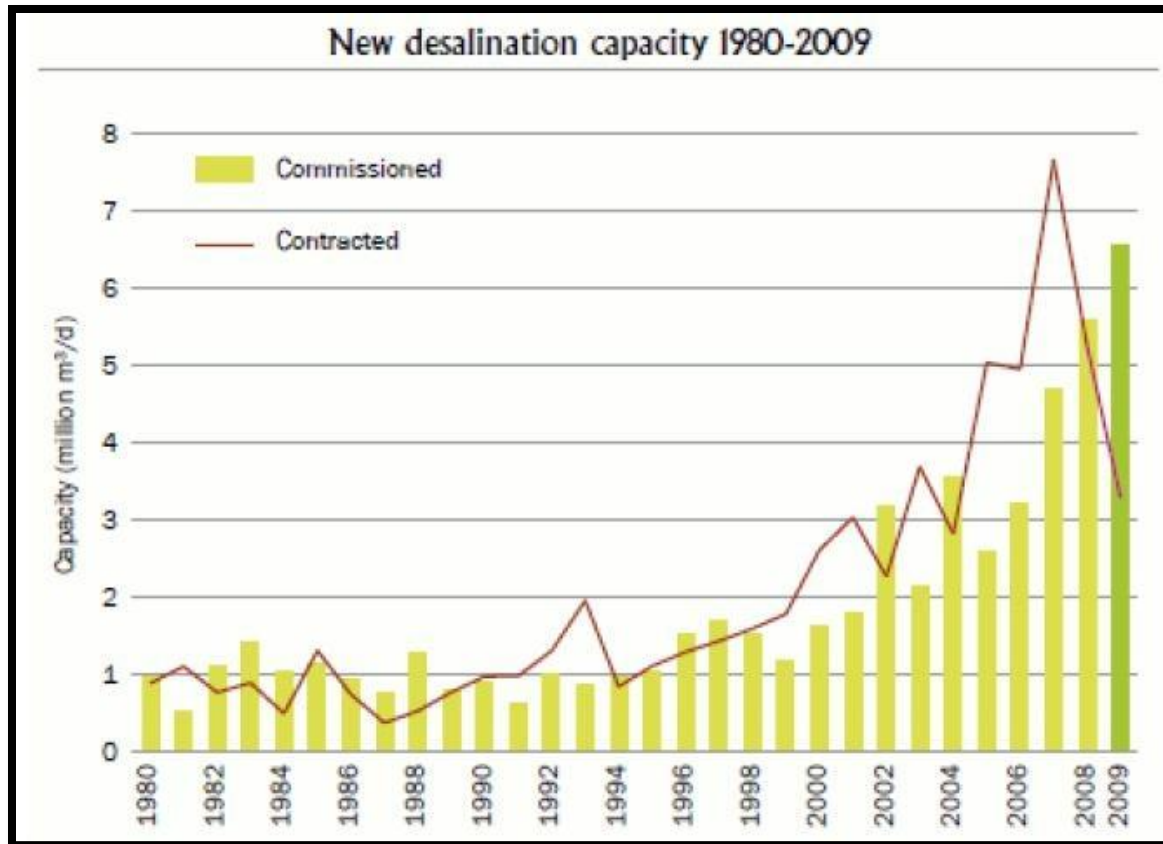
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# Introduction

- Desalination provides water security independent of climate change
- The cost is decreasing continually through technological improvement LP RO
- Negative impacts on the environment are being reduced, as alternative energy sources such as solar and wind are used

# Introduction – New Desalination Capacity 1980-2009



# Desalination Opportunities – Middle East



# Desalination Opportunities – Middle East

- Bahrain

- 2 /3 water supply from desalination but demand exceeds supply as population grows
- Current project to expand the Ras Abu Jargur desalination plant
- Commission of Electricity and Water has requested \$56 million budget to complete a new water plant



# Desalination Opportunities – Middle East

- Iraq
  - 2 new desal plants near Basra planned & tendered
  - Plans for small-scale solar-powered desal plants for rural areas
  - Canadian and Indian companies prominent in the market
  - U.S. companies favored in areas with a strong military presence

# Desalination Opportunities – Middle East

- Jordan
  - Limited access to Red Sea at Aqaba
  - Several small desal plants
  - Planned major \$125 M project: Red-Dead Sea Conveyor, taking seawater for RO desalination to the Dead Sea
  - Involves construction of water treatment plant with 55 million cubic meters per year capacity
  - Opportunity to establish desal membrane manufacturing in country



# Desalination Opportunities – Middle East

- Kuwait

- Several desal plants in operation & some under construction
- Upgrading Doha desal plant - \$750 million project
- Shuwaikh plant completion in Q4 2011 - \$370 million
- North Al-Zoor desal for completion 2013
- Population increase means demand remains high



# Desalination Opportunities – Middle East

- Oman
  - Desalination market \$542.4 m by 2016
  - Largest project – Al Ghubrah IWP (\$350 million)
  - Other projects open to tender: Salalah IWPP, Nimr Water Treatment plant, Duqm power and desal plant
  - Several significant projects ongoing:
    - Qalhat (\$6.50 million)
    - Sail Village (\$1.60 million)
    - Manadhif (\$1.30 million)
    - Al Awaifiya (\$1.50 million)
    - Sohar (\$37.12 million)

# Desalination Opportunities – Middle East

## • Qatar

- Limited and declining groundwater; ongoing investment in desal
- One of the longest-standing desal programs in the Middle East, with considerable experience in the sector
- Largest Independent Water and Power Project - Ras Girtas project, currently under construction in the Ras Laffan industrial complex
- Safe investment destination
  - US\$3.9bn Ras Girtas project managed to achieve its funding goals in mid-2008
  - When Ras Girtas becomes operational in 2011, the country will have around 1.4m m<sup>3</sup>/d of desal water
- Further IWPP under consideration, with potential for a Reverse Osmosis, possibly solar-powered plant



# Desalination Opportunities – Middle East

- Saudi Arabia

- World's largest market for desal plants
- Government plans for 10 new plants by 2016
- Over \$50 billion of investment in desalination over 10 years (from 2005)
- 7 large-scale desal projects ongoing
- Future solar-powered and reverse osmosis projects planned
- Mobile desalination barges successfully operated – more orders anticipated
- Demand is set to increase as population grows
- Several new planned cities of science and technology will also require large-scale water systems



# Desalination Opportunities – Middle East

- Main Desal Projects in Saudi Arabia



# Desal Opportunities – Middle East

- U.A.E.
  - 2<sup>nd</sup> largest producer of desal water, after Saudi Arabia
  - Consumption exceeds natural recharge capacity 24/1
  - Desal water accounts for 80+% of total consumption
  - 6 desal plants in progress, with 2 on hold; estimated over \$2 billion cost
  - Hydrogen power and desalination plant at Masdar - ongoing project

# Desalination Opportunities – North Africa



# Desalination Opportunities – North Africa

- Algeria

- 2 new desal plants
- Planned series of plants with capacities ranging from 100,000 m<sup>3</sup>/d to 500,000 m<sup>3</sup>/d
- Researching viability of low-cost solar-powered plants

- Morocco

- Infrastructure is being built practically from scratch over a prolonged period of time
- New wastewater treatment facility is seen as a project formula that can be replicated for future desal



# Desalination Opportunities – North Africa

- Egypt

- Desal plant on Sinai peninsula in operation since 2006, with expansion project ongoing
- New sea water plant in Hurghada, Red Sea
- \$36 million thermal desalination plant in Abu Qir
- Market expected to reach \$393.6 million by 2016
- Potential for more solar-powered RO plants





# Desalination Opportunities – North Africa

- Libya

- Output currently at 30 M m<sup>3</sup> p.a., contributing just over 5% of the country's output
- Projected large demand for desal technology in Libya in the coming years
- Over 60% of medium and large capacity desalination plants currently in operation are more than 17 years old.
- Desalination complex with capacity of 250,000 m<sup>3</sup> a day in Janzour launched, with investment estimated at \$650 million
- Recent awards to build 2 new desalination projects
- Plans to double capacity to desal sea water by 2025



# Desalination Opportunities – North Africa

- Tunisia

- 4 desal plants in operation
- Prior to unrest, government announced plans to build 14 new RO desal plants
- Capacity to increase to 200,000 m<sup>3</sup>/d during the next five years and 500,000 m<sup>3</sup>/d by 2025
- Tunisia has already researched solar and wind energy to power the plants

# Desalination Opportunities – India



# Desalination Opportunities – India

- India investing heavily in desal to meet demand
- by 2026, 20% of water use in coastal cities will be provided by desal
- Investment of \$8 billion expected over 20 years
- Desalination capacity due to expand by 12-15% in the near future



# Desalination Opportunities – India

- Mumbai, Gujarat and Chennai all plan large-scale desalination projects
- Investment in floating desalination barges in coastal Chennai area
- Public sector projects:
  - Minjur (\$150 million cost), Nemelli (\$190 million cost). Expected completion 2011-2012
- Private Sector:
  - Mundra, Jamnagar, Vadinar refinery, Mobile sea water desalination plant



# Thank You

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