

## Case Study: Journey of Local Outcomes of Technology Innovation

### **Catalyst Private Equity:** **Serving the MENA Region's Strategic Sectors** Energy and Water Technology and Services Fund

November 2011



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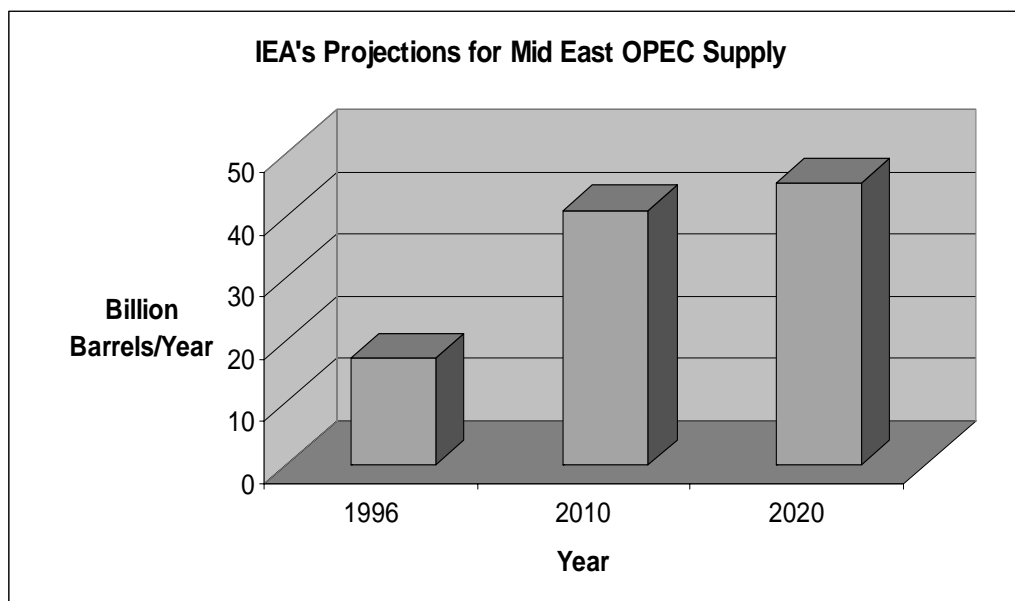
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# Innovation Culture and the Arab World

- History of Innovation
- Several Hundred Years OFF the Innovation Map
- 2003-2010 – Awakening – 4 Factors
- Eco-System Forming
- Challenges in Investment, Professional Company (and Technology) Development
- Results/Success Will Drive Further Success
- You Create Your Own Reality – Be Practical, Market Focused, and Do Not Give Up

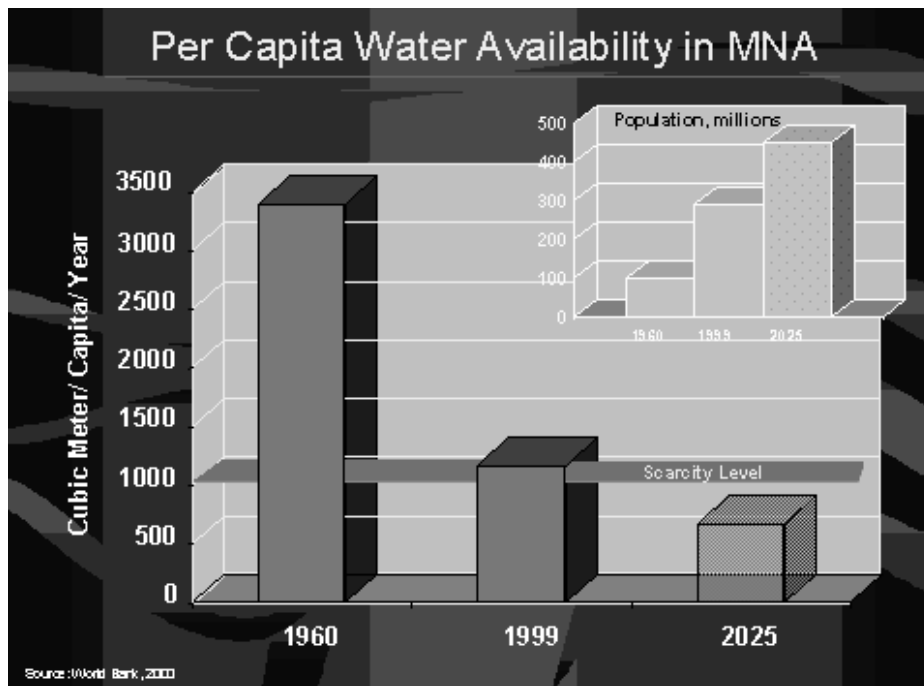
## Market Opportunity – Oil/Gas



Over \$100 Billion per year will be spent on current and future oil/gas capacity and operations in MENA.

Significant portion allocated to improving efficiency and environmental friendliness

# Market Opportunity - Water Treatment

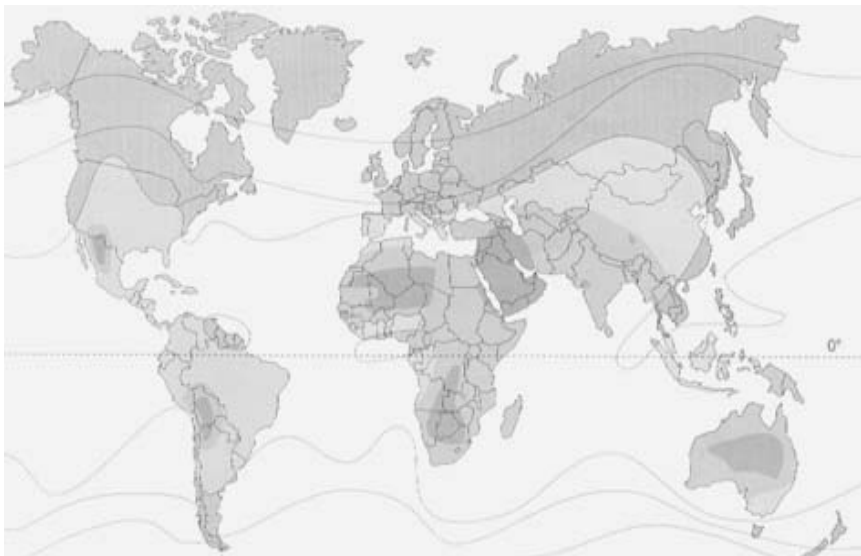


In MENA, there is a strategic imperative to increase the water treatment capacity.

Over 60% of the world's desalination capacity is in the GCC countries.

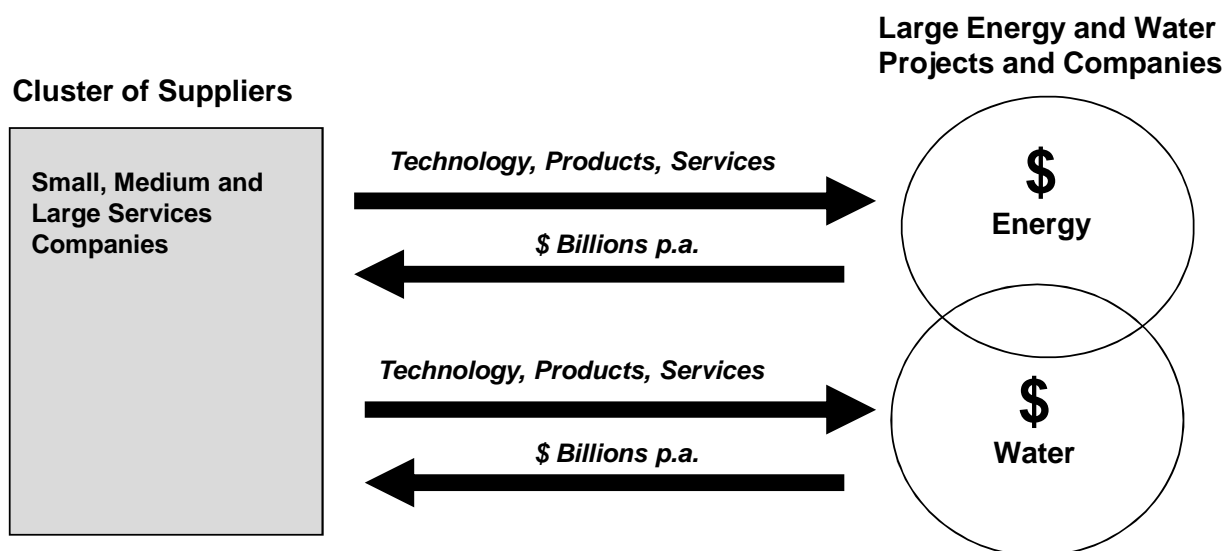
# Market Opportunity – Solar Energy

The MENA Region has the world's highest solar **insolation (concentration)**, 5.5 Kwh/m<sup>2</sup> on average.



# Building the MENA Region's Supplier Base

The MENA countries are the only group among top users of technologies, products, and services in Energy and Water Treatment that have NOT also developed a regional value added and sustainable supplier base.



## Executive Summary

**Catalyst Private Equity is a specialized investment company, focusing on equity financing and proactive growth of SME's that support the MENA region's Energy and Water sectors.**

- **Investment Company Overview:**
  - \$25.41M in equity and \$33MM Board commitment from the US Overseas Private Investment Corporation (OPIC.)
  - Intention to begin distributing profits years 5-6 (2011-2012)
  - Target IRR of 25% per annum, cumulative.
  - Currently seeking to increase equity under management .
- **Specialized in the Region's Strategic Sectors:**
  - Alt. Energy: the region has one of the highest solar energy concentrations globally, recent subsidy removals
  - Oil/Gas Efficiency/Environmental: over \$100Billion spent per year by the region in oil/gas sector
  - Water Treatment: over 60% of the world's desalination capacity is in the GCC
- **Investment Management Approach**
  - Management team has a strong operational and investment background, regionally and globally.
  - Relationships with some of the region's top industrials including Saudi Aramco, METITO, Schlumberger, etc.
  - Proprietary network and pipeline of target companies and professional management.
- **Current Status**
  - Launched in December 2006.
  - Acquired majority stake in Millennium Energy Industries Jordan (MEI) as a platform, controlling stake in MEI Palestine, strategic stake in Omni Oil Technologies, majority stake in X3M International, additional under review.
  - In discussions for additional equity from institutional investors.

# Current Catalyst Portfolio - Holdings

Portfolio Attribute	Omni Enterprise Holdings	X3M International	Millennium Energy Industries	MEI Palestine JV
<b>Overview</b>	Dubai based drilling enhancement tool engineering and manufacturing firm. In 2010 Omni made 3 100% acquisitions: <i>Encore Houston, Caledus UK, and Diamant Belgium. 2 additional in process</i>	MENA region oil/gas well intervention efficiency tools. Norwegian R&D Center, Abu Dhabi based. Opportunity for Jordan Logistics/ Services Center.	Amman based, regional solar thermal heating and cooling technology and services. Largest solar heating reference globally. Proprietary cooling and water technologies. 100MW CSP Project being developed. USTDA Grant.	Ramallah based fully functional MEI operation to cover the West Bank and Gaza markets, with support from MEI. Strategic co-investors include Catalyst and APIC (Arab Palestine Investment Company)
<b>Current % Ownership</b>	6%	64%	90%	42.5%
<b>Special Terms</b>	Partial IPO Planned for 2012, BOD Seat	Board control	Board control	Board control through MEI + Catalyst

## Portfolio Summary

- Omni Oil Technologies - Oil/Gas Drilling Efficiency Tools: Regional design and manufacturing, world class management team, top oil co. clients.



**Annual Sales : 2007 \$4M; 2008 \$6M; 2009E \$8.3M; 2010E \$16M\***

*\* without 2010 acquisitions. Over \$40M with the 3 acquisitions.*

- Millennium Energy Industries - Solar Heating/Cooling Solutions: Regional system integration of solar heating/cooling solutions for commercial, and industrial clients. On-going R&D in solar cooling. Platform company, with related and affiliate investments for Catalyst.



**Annual Sales : 2007 \$0.59M; 2008 \$1.6M; 2009E \$2.2M; 2010E \$13M\***

*\*already contracted*

- Extreme Invent (X3M) - Oil/Gas Efficiency Tools: Regional technology and services for more efficient well testing and maintenance.



**Annual Sales: 2007 \$0.7M; 2008 \$2.8M; 2009E: \$3.4M; 2010E \$3.0M**

# Millennium Energy Industries - Highlights

For example, a MENA region platform for commercial and industrial alternative energy solutions – 90% owned by Catalyst based in Jordan with offices in KSA and UAE:

1. Regional Leader Solar Heating/Cooling Solutions, clients include MASDAR, Marriott Hotels, Safeway, Jordache Jeans Factory, PNUW largest globally
2. Client Payback 0-5 Years
3. Proprietary Solar Cooling Technology
4. Developing Power Projects and Renewable Utility Concept
5. 2007 – 2008: 300% growth, 2008 – 2009: 40% growth
6. 2010: 700% sales growth based on current contracts
7. \$15+M contracted in H1 2010

Schlumberger

MÖVENPICK  
Hotels & Resorts

MASDAR  
ABU DHABI FUTURE ENERGY COMPANY

مصدر  
شركة أبوظبي لطاقة المستقبل



# Solar District Hot Water – 25 MW – Largest Globally – PNUW KSA



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## PNUW: 36,000m<sup>2</sup> of Solar Collectors



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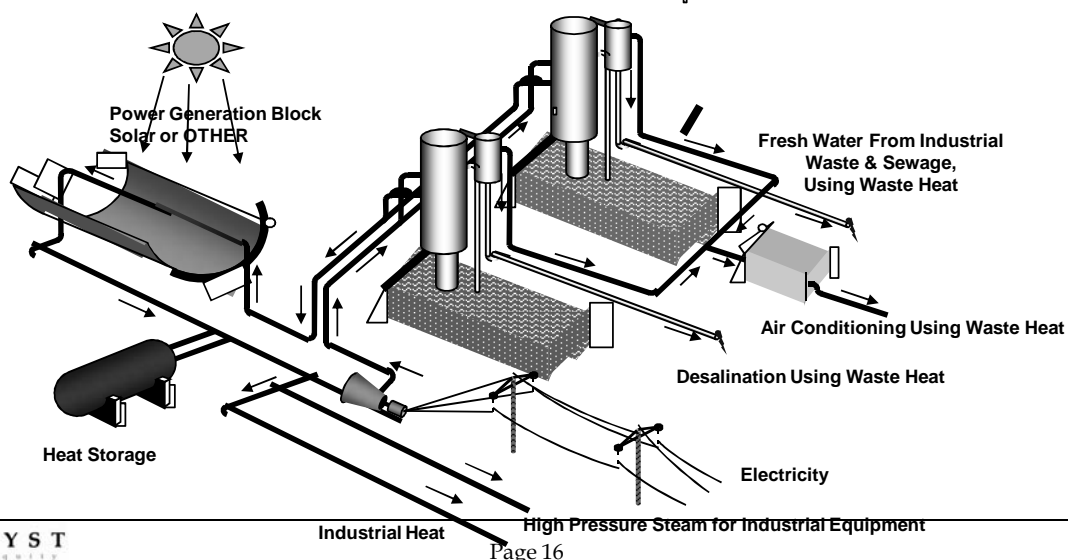


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## MEI: Commercializing Proprietary Technologies – R&D

MEI's R&D efforts are focused applications of solar or waste heat, both cooling and water treatment.





# History of Thermal Cooling

- Thermal cooling goes back to more than 150 years
- The main purpose was to produce Ice for the wealthy families in EU and USA.
- The first commercial ice making machine running on a solution of water and sulfuric acid was invented in 1854

## Types of Thermally Driven Chillers

- Single effect absorption  
Many products in market, Referent/sorption pair either water/LiBr or ammonia water.
- Double effect absorption  
Often direct fired systems with capacities more than 100KW. Ref. pair usually water/LiBr
- Adsorption  
Commercially sound with typical ref/adsorption pair as Water/silica gel (SorTech)

# Small Capacity Chillers

Europe is leading in development of small thermally driven chillers



**EAW**



**rotartica**



**SorTech AG**



**PINK**



**ClimateWell**



**SK SonnenKlima GmbH**

## Temperature Needs / Efficiency

- Single effect absorption collectors, or CPC collector. COP 0.5 - 0.7  
70 -100 C<sup>0</sup> – Flat plate  
Evacuated tube  
Chiller
- Double effect absorption collectors  
Chiller COP 1.2-1.5  
130 -180 C<sup>0</sup> – Parabolic  
with tracking.
- Adsorption collectors or tubes (Such as SorTech).  
Chiller COP 0.5-0.7  
65 -85 C<sup>0</sup> – Flat Plate  
Evacuated

# Solar Cooling – Sortech 2009



## MEI Chiller: Differentiation

- Competitor systems limited to  $<35^{\circ}\text{C}$  ambient
  - Above  $35^{\circ}\text{C}$  these systems need:
    - Water Tower
    - AND
    - Humidity  $<50\%$  for efficient water tower operation
- Millennium System competitive advantages:
  - System design ambient temperature can be  $>35^{\circ}\text{C}$  without water towers
  - Locations with high summer humidity possible (Coastal Gulf: UAE, Oman etc)

# Development Status

- Millennium patents for **2-Stage Adsorption Chiller** filed internationally
- Positive experimental validation of theoretical performance
  - System scaling optimised
  - Operating temperature range defined
- Prototype build complete and undergoing long term testing
  - 10kW cooling capacity at industry standard 35°C ambient temperature
- Design for commercial pilots underway
  - Reduced cost
  - Optimised performance
  - Full system integration (solar array, re-cooler, chilled water)
- Pilot deployment planned summer 2011, Further pilots in 2012

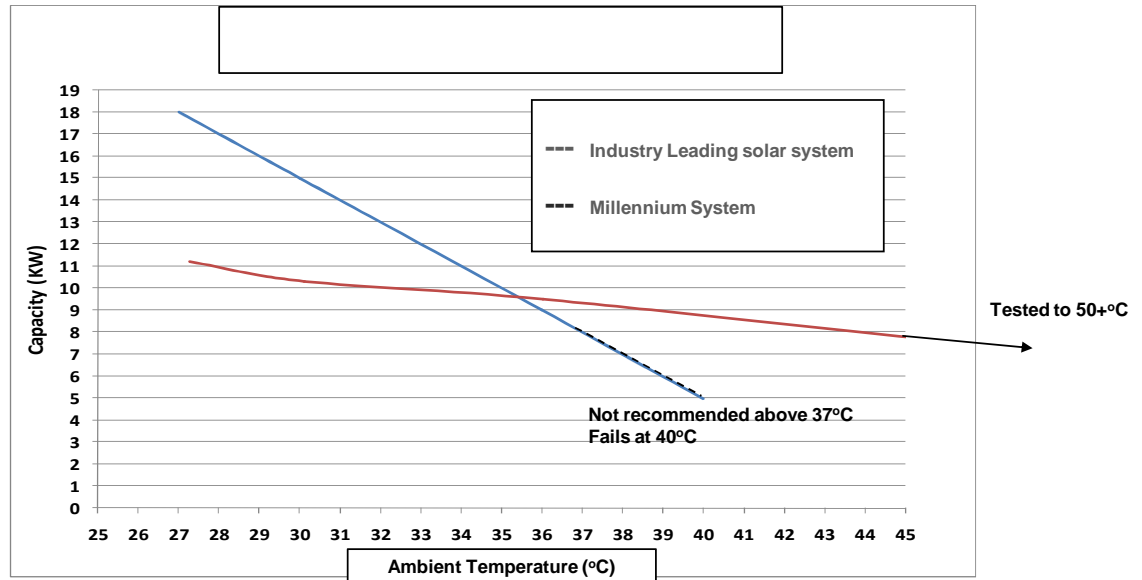
# Commercial Differentiation

- Prior to cost optimisation, Millennium system cost is competitive with alternate systems

System	Nominal Capacity (kW)	Actual Capacity at 35°C (kW)	Chiller Cost (US\$)	Solar Matrix (US\$)	Re-cooler or Tower Cost US\$	Cost per kW \$/kW
Competitor #1	15 at 27°C	10	20,000 For 100 order	38,000	7,740	Price 6,574
Competitor #2	17.5 at 31°C	NA (est. 15)	17,590	35,000	7,740	Price 4,022
Millennium v2 (Prototype)	10	10	15,000 1x	35,000	2,000	Cost 5,200

# Commercial Differentiation

**Unique** product capable of operation at high ambient temperatures

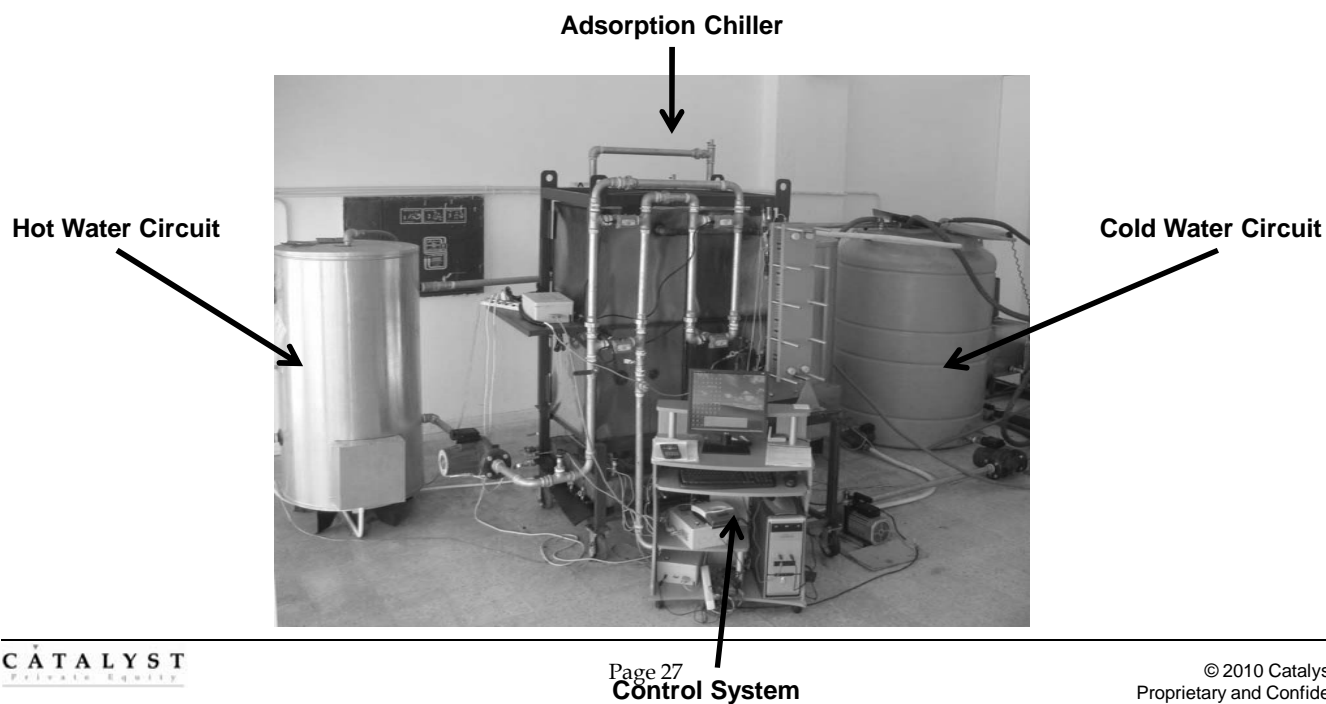


## R&D – MEI Chiller Product Development Status – 2008/09



# R&D – MEI Chiller Product Development Status - 2010

Version 2 tested in Jan 2010, V3 built and ready for Field Pilots in Sept. 2010



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## Aqaba Pilot – Field Test Aug. 2011



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# X3M - Oil/Gas Efficiency Tools/Services Rig-less Testing

Regional oil/gas intervention technology services company:

1. Regional leader for HOSTILE environments, clients include Shell/Aramco JV (SRAK), Qatar Petroleum (RasGas), PDO, etc.
2. New rig-less testing technology 80% cost saving, faster, and safer
3. 2007 – 2008: TURNAROUND plus 4 x sales growth, profitable
4. 2008 – 2009: 20% sales growth, plus technology proven in field.
5. 2010: Awarded first direct contract with Aramco.



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## Omni Oil Technologies



- MENA and Asia region oil/gas drilling efficiency technology and manufacturing company. Based in Dubai, with centers in KL, Malaysia, and Cairo. *Now also Aberdeen, Houston and Belgium. Presence in 45 countries.*
- Breakeven in 2009 with 30+% sales growth
- Late 2009, strategic entry by top US Oil/Gas Services PE.
- Pursuing aggressive acquisition strategy, recently acquired Encore – Houston based drill bit company.
- Also acquired Diamant Drilling Services (Belgium)
- In Q2 acquired Caledus (UK), several others in negotiation.
- Targeting partial IPO in 2012
- Catalyst has rights to co-invest further.

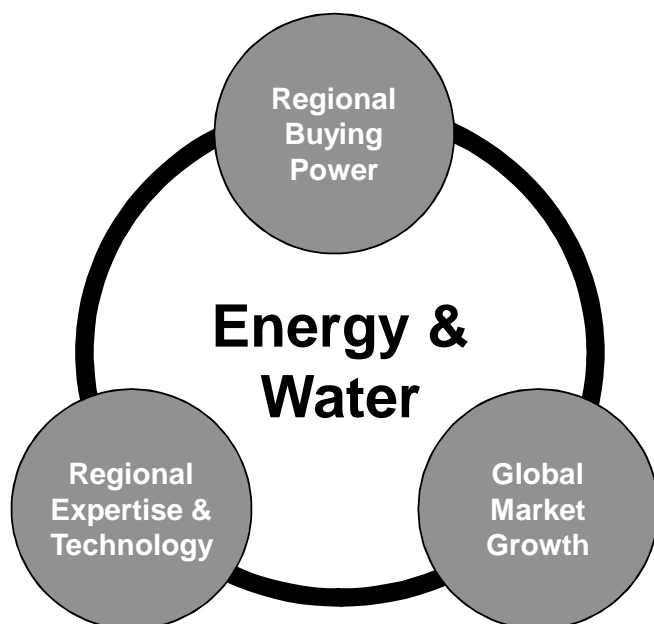


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# Summary



**CATALYST** is the **first** and **only** investment company specializing in Energy and Water technology.

With an established:

- **Team** with proven industry and investment track records
- **Pipeline** of exciting industry prospects
- **Structure** tailored to the MENA region

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## Catalyst Private Equity Fund I Limited

*Serving the MENA Region's Strategic Sectors*

Energy and Water Technology and Services

**Thank You**

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