

SPANISH CYPRIOT PARTNERING EVENT

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Desalination in Cyprus

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Presentation Overview

- Brief description of the main parts of a Desalination Plant
- Existing Desalination Plants in Cyprus
- The contribution of the Desalination Plants to the Water Balance
- Environmental Aspect
- Financial Aspect
- New Desalination Projects in Cyprus
- Conclusions

Brief description of the main parts of a Desalination Plant

- Sub-sea conveyors for sea water collection (500m at Dhekelia, 1km at Larnaca and 800m at Moni) and sub-sea conveyors for brine rejection(500m at Dhekelia , 1.3km at Larnaca and 1km at Moni).
- Sea water pumping station.
- Ground conveyors to transfer sea water to the desalination plant and reject brine to the sea.
- Desalination Plant
 - Pre-treatment
 - Reverse osmosis
 - Post-treatment
- Treated / desalinated water reservoir
- Treated / desalinated water pumping station

Existing Desalination Plants

	DHEKELIA	LARNACA	MONI
CONTRACT TYPE	BOT	BOT	BOR
START OF PRODUCTION	20 th May 2007	12 th July 2001	22 nd December 2008
PERIOD	20 Years	10 Years	3 Years
CAPACITY	60.000 m ³ /day	62.000 m ³ /day	20.000 m ³ /day
MINIMUM DAILY PRODUCTION (m³)	54.000 m ³	55.800 m ³	18.000 m ³
MINIMUM YEARLY PRODUCTION (m³)	19.770.000 m³	21.352.500 m³	6.570.000 m³
SELLING PRICE	€0.82/m ³	€1.08/m ³	€1.39/m ³

Contribution to the Water Balance

Today,

The water demand for the provinces of Nicosia, Larnaca, Famagusta and Limassol together is:

72.300.000 m³/year

Desalination contributes :

46.862.000 m³/year (minimum yearly production)

Therefore. the three Desalination Plants contribute to the Water Balance 65% of the total demand in drinking water

Environmental Aspect

- Desalination is a Power Hungry Process - Emission of Greenhouse Gases.
- Slight Impact on the Marine Environment – Increased Salinity at the point of Brine Rejection
- Very High Sound Levels Inside the Plant

CONTRIBUTION TO CO2 EMISSIONS

PERCENTAGE OF THE COMBINED POWER CONSUMPTION TO THE TOTAL EAC POWER GENERATION

YEAR	DHEKELIA %	LARNACA %	MONI %	COMBINED PERCENTAGE %
1997	1.02	-	-	1.02
1998	1.80	-	-	1.80
1999	2.30	-	-	2.30
2000	2.16	-	-	2.16
2001	1.95	1.00	-	2.95
2002	1.77	2.00	-	3.77
2003	1.72	1.88	-	3.60
2004	1.60	1.76	-	3.36
2005	1.59	1.86	-	3.45
2006	0.99	1.75	-	2.74
2007	0.98	1.69	-	2.67
2008	1.65	1.75	-	3.40
2009	1.75	1.75	0.65	4.15

Financial Aspect

DESALINATED WATER PRODUCTION		
DHEKELIA (1997-2007) (m³)	LARNACA (2001-2007) (m³)	TOTAL (m³)
122.985.322	112.083.355	234.798.677

DESALINATED WATER COST		
DHEKELIA (1997-2007) (€)	LARNACA (2001-2007) (€)	TOTAL COST (€)
137.812.166	80.196.431	218.008.597

DESALINATION PLANTS-YEARLY PRODUCTION AND COST 2007-2009

PERIOD	PLANT	QUANTITY (m ³)	COST (€)	COST (€/m ³)
2007	DHEKELIA	8.208.256	11.978.701	1,46
	LARNACA	18.188.714	17.170.021	0,94
	TOTAL	26.396.970	29.148.721	1,10
2008	DHEKELIA	14.797.799	14.057.848	0,95
	LARNACA	18.012.556	21.486.021	1,19
	TOTAL	32.810.355	35.544.069	1,08
2009	DHEKELIA	19.621.180	16.182.449	0,82
	LARNACA	20.655.909	22.278.970	1,08
	MONI	6.585.000	9.039.656	1,37
	TOTAL	46.862.089	47.501.075	1,01

Financial Aspect

Summarized:

- Average Power Consumption:
4.50 Kwh /m³
or
213.754.837 kwh/year
approximately for the three
Desalination plants

Upgrade of Desalination Projects in Cyprus

- Extension of Dhekelias' Desalination Plant from 50.000 m³/day to 60.000 m³/day (April 2009) : €0.78/M³
- Extension of Larnacas' Desalination Plant from 52.000 m³/day to 62.000 m³/day (January 2009): €1.32/M³ *
 - After the extension the production increases:
 - Minimum Yearly : 38.872.500 m³
 - Maximum Yearly: 44.530.000 m³

* Price disproportionally high because of amortization of the capital in 3 years

New Desalination Projects in Cyprus

- New Desalination Plant in Limassol with a capacity of 40.000 m³/day (60.000 m³/day) in 2,5 years
- Mobile Unit at Paphos with a capacity of 30.000 m³/day (April 2010)
- Vasilikos (EAC) Plant with a capacity of 60.000 m³/day (2 years)
- New Desalination Plant in Paphos with a capacity of 40.000 m³/day (~ 2 years)

* Price disproportionately high because of amortization of the capital in 3 years

New Desalination Projects in Cyprus

Our Contracts have provisions for :

- Reduction of the production.
- Halt the production and maintain the Plant in standby mode.

In the above cases, the Contractor will receive part of the unit price.

(capital cost + part of the maintenance cost)

Conclusions

- The inevitable choice to built Desalination Plants in Cyprus has proved particularly beneficial for the agriculture and salvation for the water supply of urban areas.
 - Nevertheless building Desalination Plants is not panacea.
 - The environmental impact, mainly because of the emission of greenhouse gases, should not leaves us indifferent at times where our planet struggles for survival.
 - Furthermore the production cost, which is not recovered, at times where the oil price is unstable and just recently it marked a record high should have us seriously concerned.
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Thank You

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