Comparison of Selected Desalination Processes

TECHNOLOGY		MEMBRANE	THERMAL			
Operational Temperature		Ambient	High Temp.	Low Temperature		
Process		**SWRO**	**MSF**	**MED**	**TVC-MED**	**MVC**
Electricity Consumption	(kWh/c^3)	3.3-5.0	3.0-3.5	1.3-1.4	1.0-1.3	7.2.0-9.0
Motive Steam Pressure (min)	(ata)	N/A	2.2-5	0.35	2.2-2.5	N/A
Possible unit size (up to)	c^3/day	50,000	60,000	25,000	35,000	5,000
Possible / Achievable GOR		N/A	10	10-14	14-17	N/A
Possible number of effects		N/A	30	7-25	15-18	5
Product quality received	(ppm TDS)	Stage 1: 400 Stage 2: 40	<5	<5	<5	<5
Limiting factors		Seawater quality	Pumps, valves & plant weight	Vessel size	Vessel size	Compressor
Minimum intake requirements		Deep water or beach wells	Shallow water	Shallow water	Shallow water	Shallow water
Fully automatic and unattended operation		Possible but risky	Possible	Possible	Possible	Possible
Tolerance to operator's faults		None	Medium	High	High	High
Tolerance to changing sea water composition and pollution		None	High	High	High	High
Requirement for sophisticated pre-treatment (in case of contaminated seawater		Necessary	Minimal	Minimal	Minimal	Minimal

Process		SWRO	MSF	MED	TVC-MED	MVC
Chemical and anti-scalant consumption		Medium	High	Low	Low	Low
Maintenance requirements		High	Low	Low	Low	Low
Spare Parts or requirements of replacement parts		High replacement of membranes	Low	Low	Low	Low
Spare parts (% of equip./year)	(%/year)	1.5-2	2	0.5-1	0.5-1	<1
Civil works maintenance	(%/year)	0.5	-	-	-	-
Heat transfer area		N/A	High	Low	Low	Low
Failure potential if corrosion occurs		High	High	Low	Low	Low
Periodic cleaning (months)		3-12	3-6	18-24	18-24	18-24+
Operational Skilled Manpower Requirements		High	Medium	Low	Low	Low
Precise manufacturing requirements		High	Medium	Low	Low	Low
Ratio between product and total seawater flow		0.45-0.50	0.15-0.20	0.25-0.30	0.35-0.40	0.40-0.45
Experience Available		Medium	High	High	High	High
Annual Availability (%)		92-95	90-92	96-98	96-98	96-98
Reliability (Process)		Medium	Medium	High	High	High
Plan Life Expectancy in years		12-15	25-30	25-30	25-30	25-30