

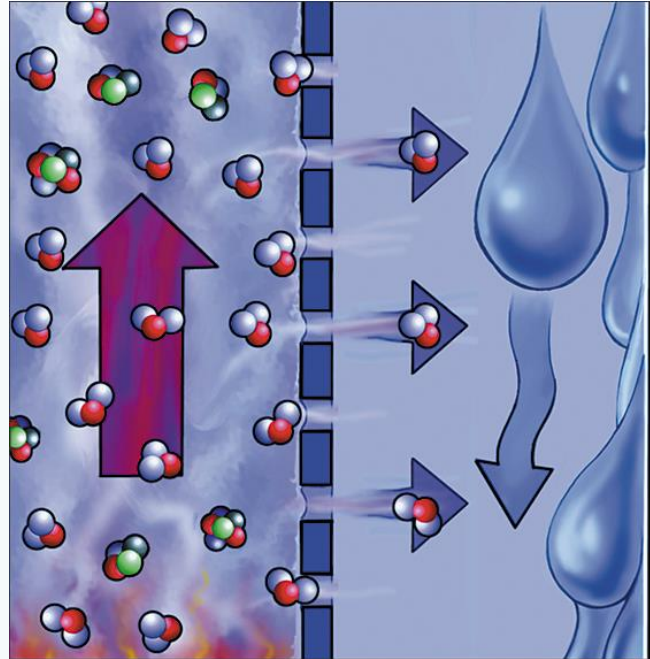
MEMBRANE DISTILLATION

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Scarab Development AB
2019

OUTSTANDING PERFORMANCE

- Total removal
- Uses waste heat
- Can achieve zero liquid discharge

COMPLETE SEPARATION IN AIR GAP



Warm feed water ($< 100^{\circ}\text{C}$) flows past a hydrophobic membrane. Only single water molecules (water vapor) go through the membrane and condense on a cold surface on the other side (gap = 1-2 mm). All non-volatiles (particles and ions) remain in the feed.

TYPICAL TEST RESULTS

Type of contamination	Amount	Result	Method	Detection level	Test by
Bacteria	14 000 (after 7 days)	0	Membrane filter count	-	National Bacteriologic Laboratory, Stockholm
Chlorine	3.4 mg/l	0	Photometric analysis (Perkin Elmer)	< 0.01 mg/l	Water Protection Ass of South West Finland
Salt water	31 000 ppm	0	Ion	< 1 ppm	VBB Viak Stockholm
Trihalomethanes	1 000 µg/l	0	Gas	< 1 µg/l	University of Turku, Finland
Radon	380 Bq/l	0	Alfa detection	< 4 Bq/l	Swedish Radiation Protection Institute
Cesium Strontium Plutonium Radium	2.4 Bq	0	Lithium Drifted Germanium Detector	< 0.1 Bq	Radiation Physics Department, Univ of Lund
Arsenic +3	10 mg/l	0	AAS Graphite	< 0,003 mg/l	Analytica AB, Stockholm
Arsenic +5	10 mg/l	0	AAS Graphite	< 0,003 mg/l	Analytica AB, Stockholm

EXAMPLES OF PRODUCTS

Removal of pharmaceuticals

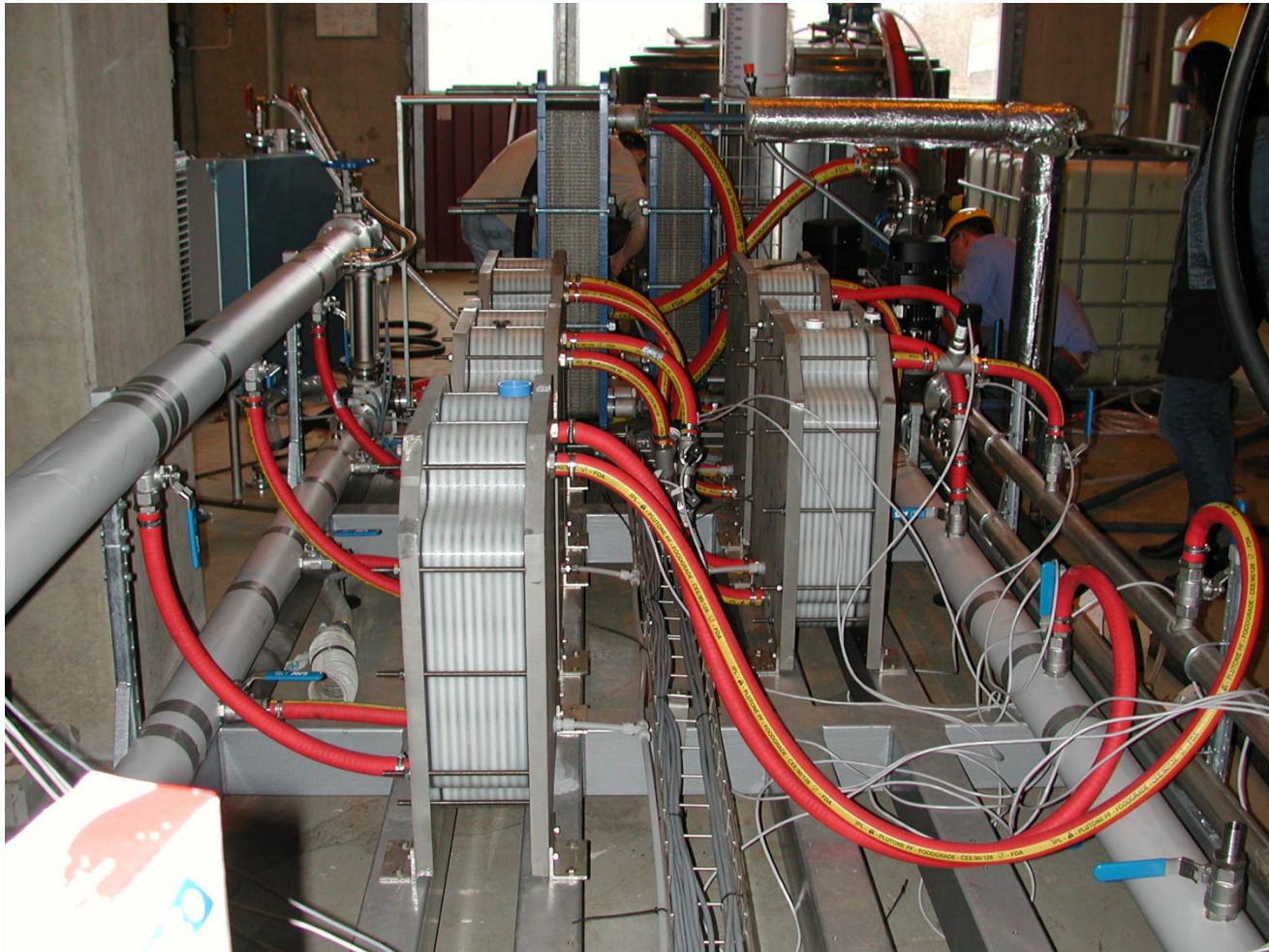
Ultra Pure Water for the
semiconductor industry

Desalination

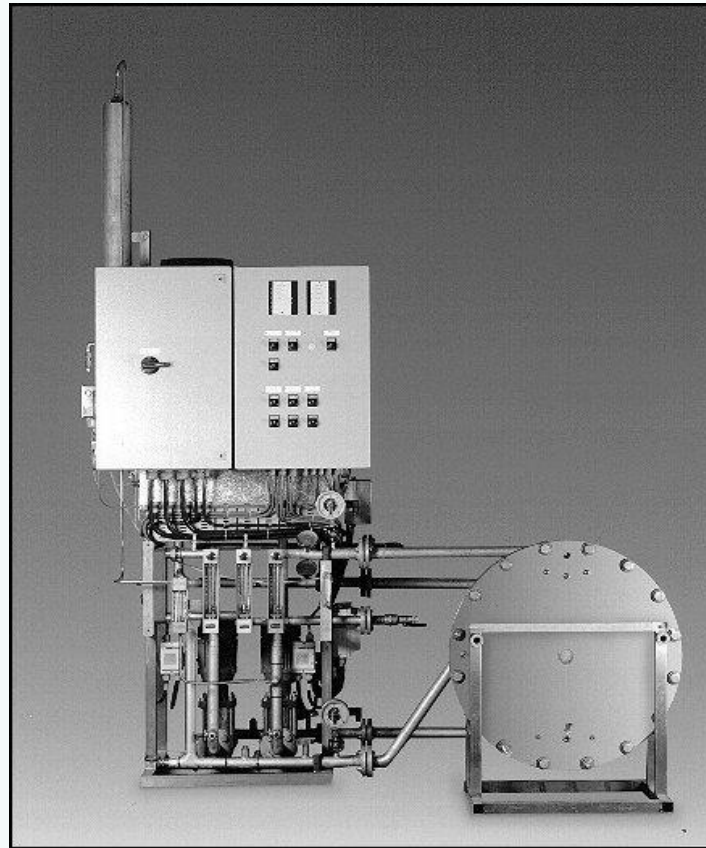
House-hold purifiers

DEMO AT POWER PLANT

– testing purification of flue-gas condensate

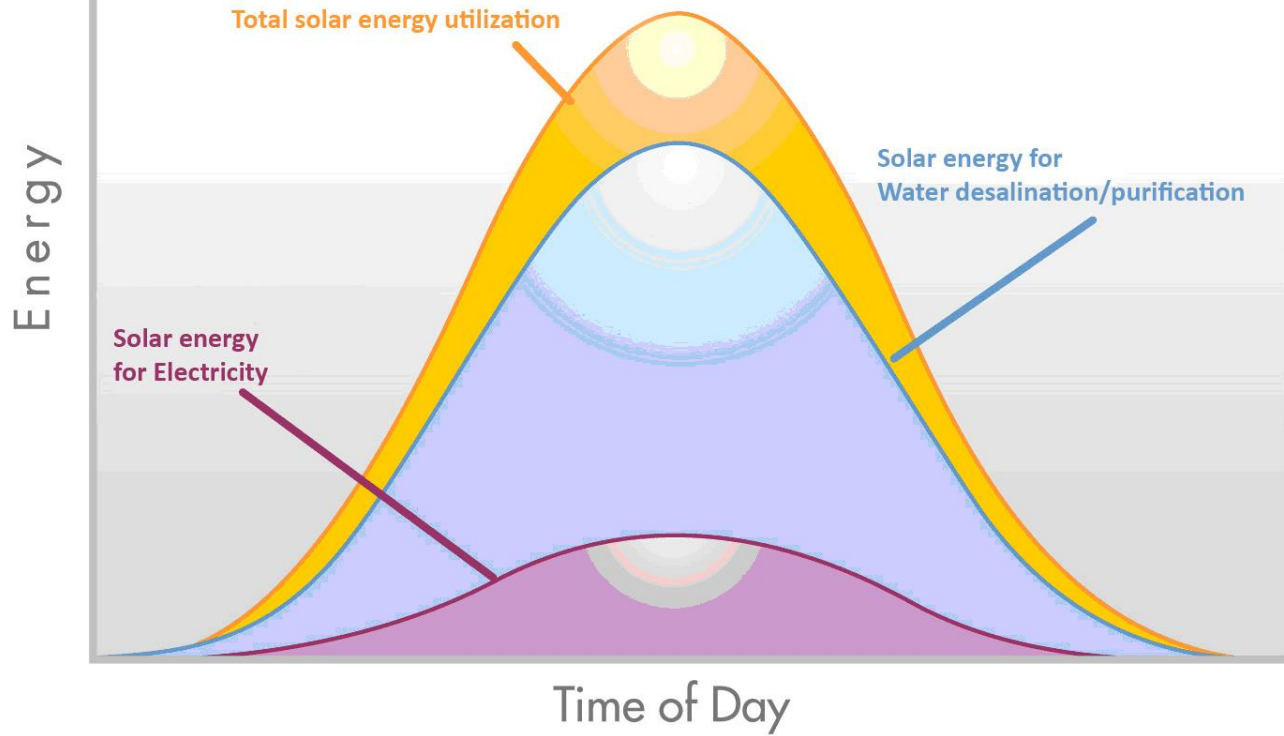


Test unit for semiconductor industry rinse water (type two module ABB CR/SwedeWater)



TESTED AT SANDIA NATIONAL LABORATORIES, NM, USA

Solar Co-generation of electricity and water (PVTMD)



PROJECT DEVELOPMENT

1973 Research starts

1991 Public companies

2001 Co-operation with KTH

2007 Industrial test

2010 Demos to customers

2016 Industrialisation

2020 Commercial products

THANKS

Aapo Säask

Scarab Development AB

KONKURRENSKRAFT

- Om ABB flyttar ut, skogen krymper och Volvo följer varven... - från Dagens Industri, 92-09-04
- Därför får Sverige inga nya högteknikbolag - från Dagens Industri, 95-06-06
- Att investera i innovationsföretag - oktober 2000