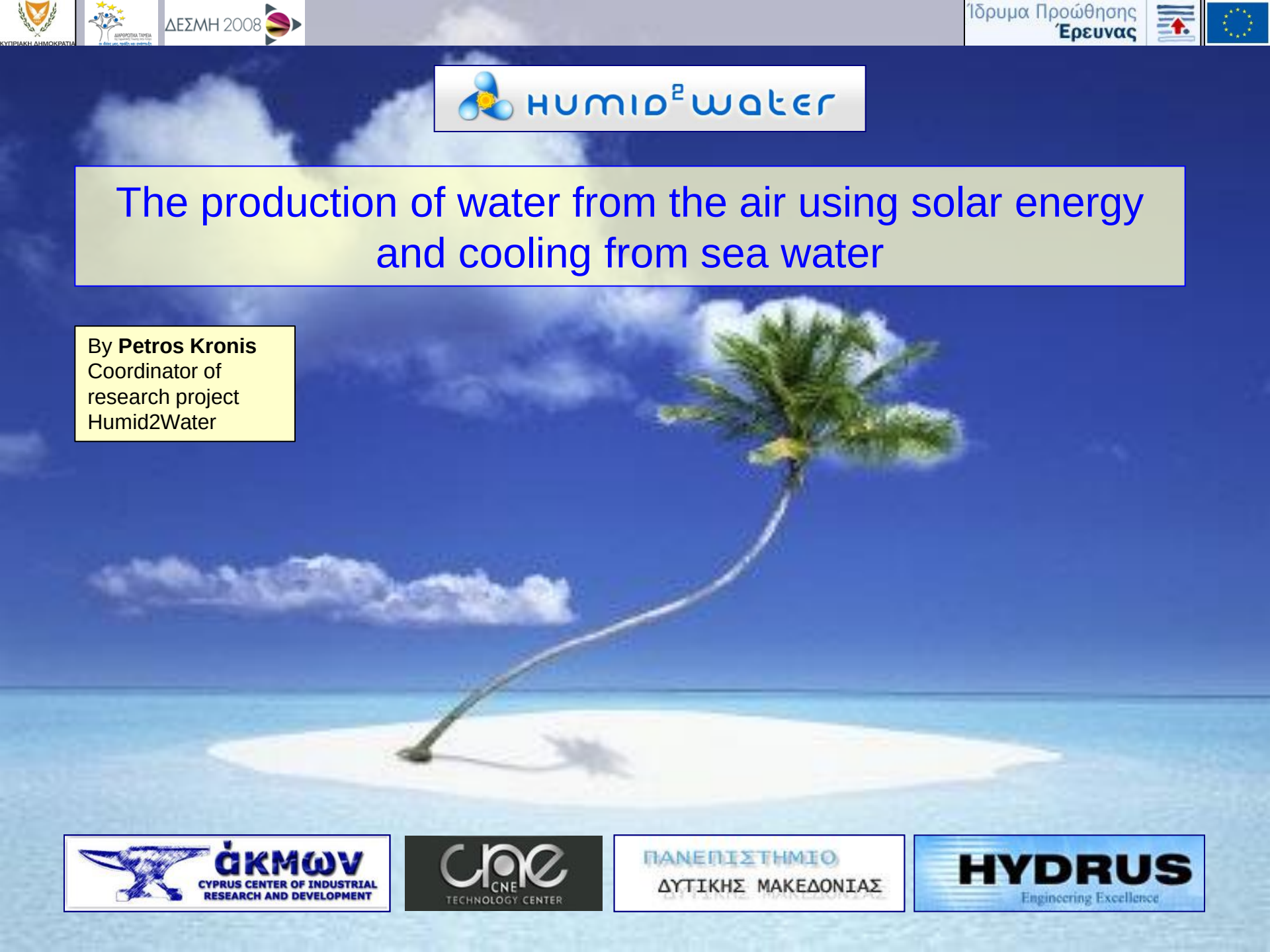
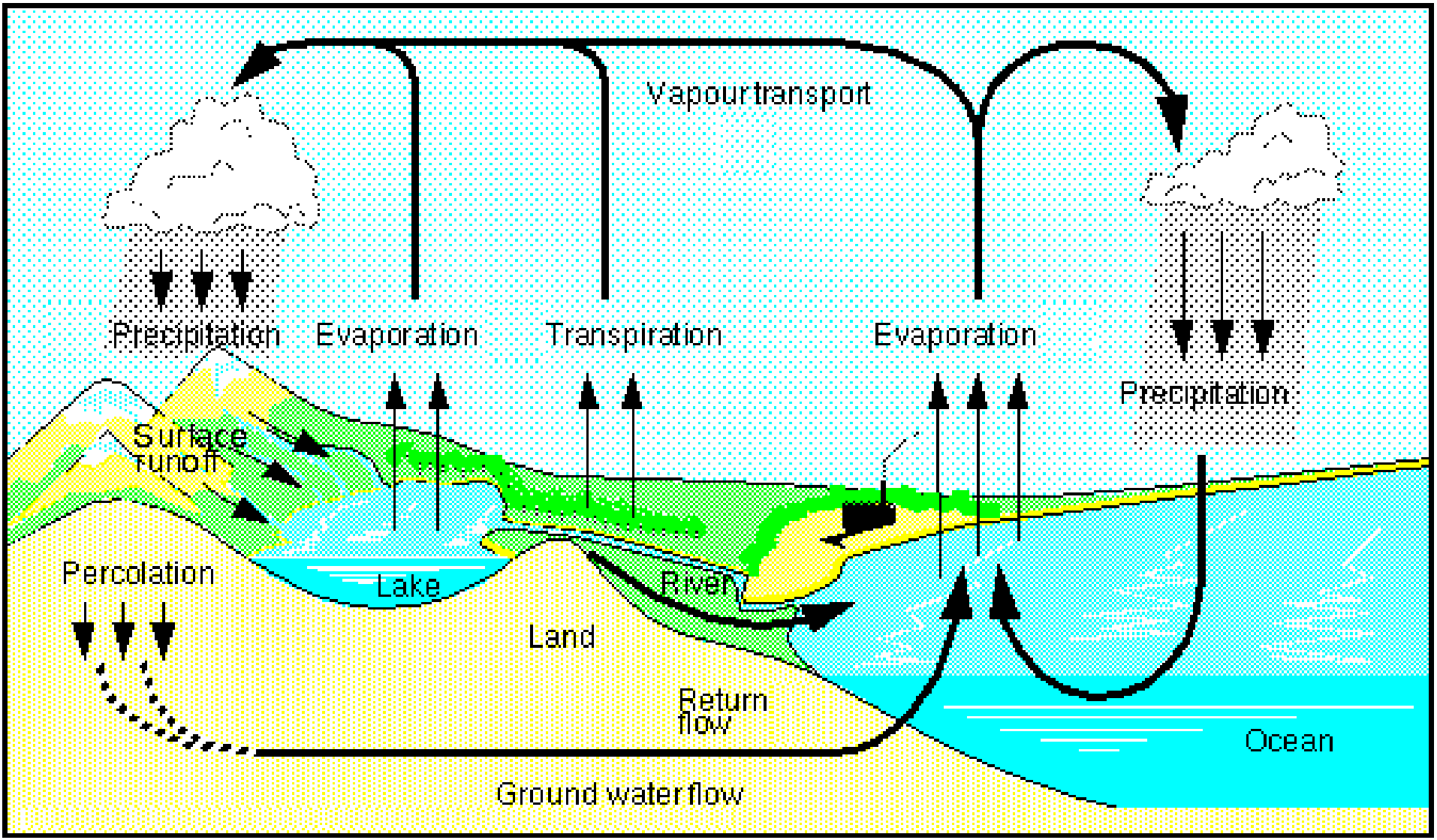
The production of water from the air using solar energy and cooling from sea water

By **Petros Kronis**
Coordinator of research project Humid2Water



HUMID²WATER

- The earth's atmosphere, at any time, contains about 12900 cubic kilometres of water
- The earth's atmosphere is the natural source of fresh water
- We believe that water taken from the atmosphere could provide a solution to the problem of fresh water shortage



Courtesy Erich Roeckner, Max Planck Institute for Meteorology

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ΔΕΣΜΗ 2008

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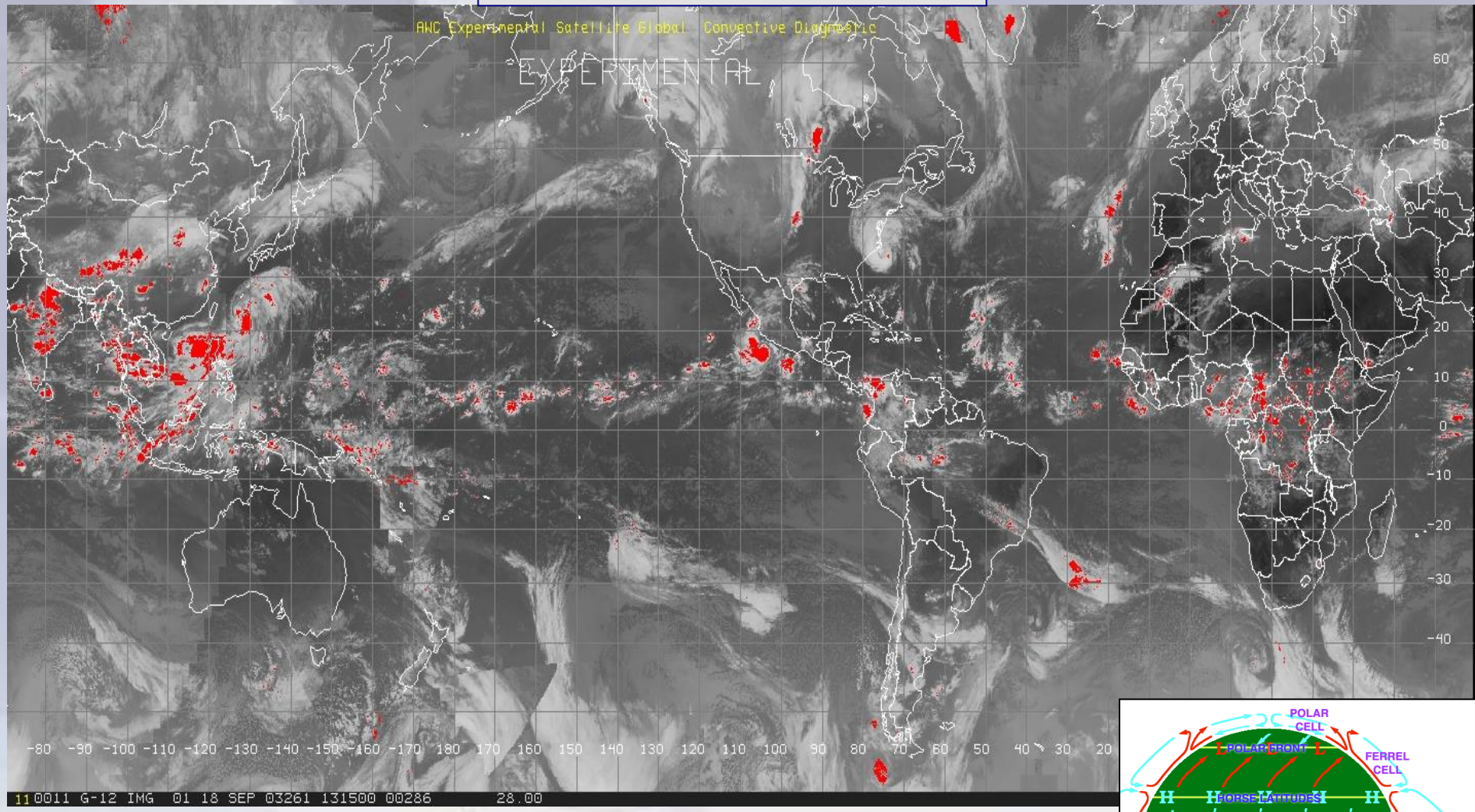
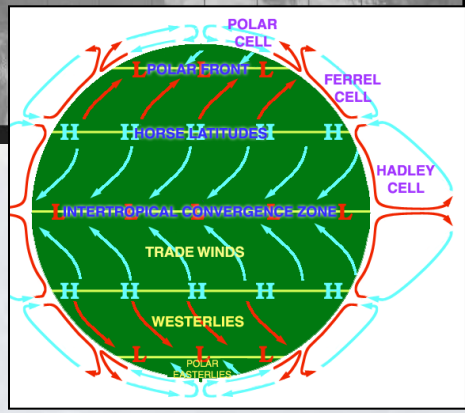
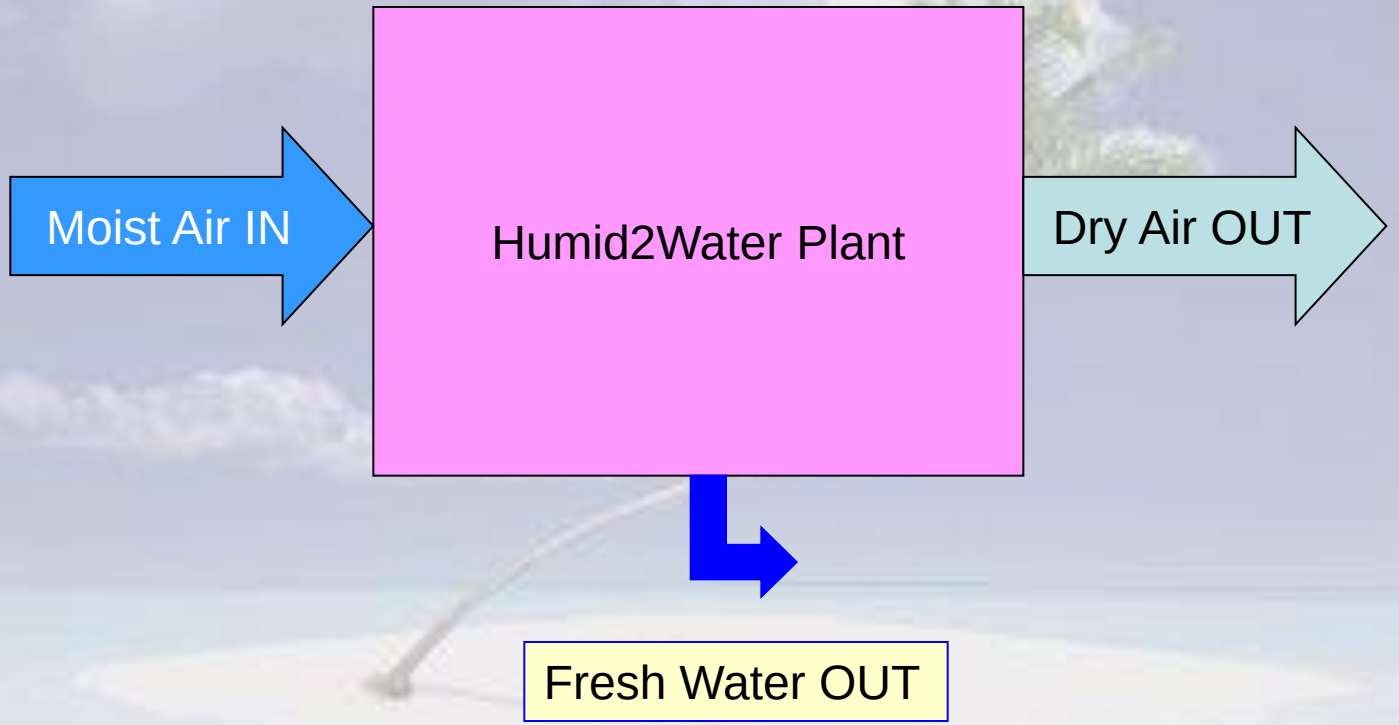
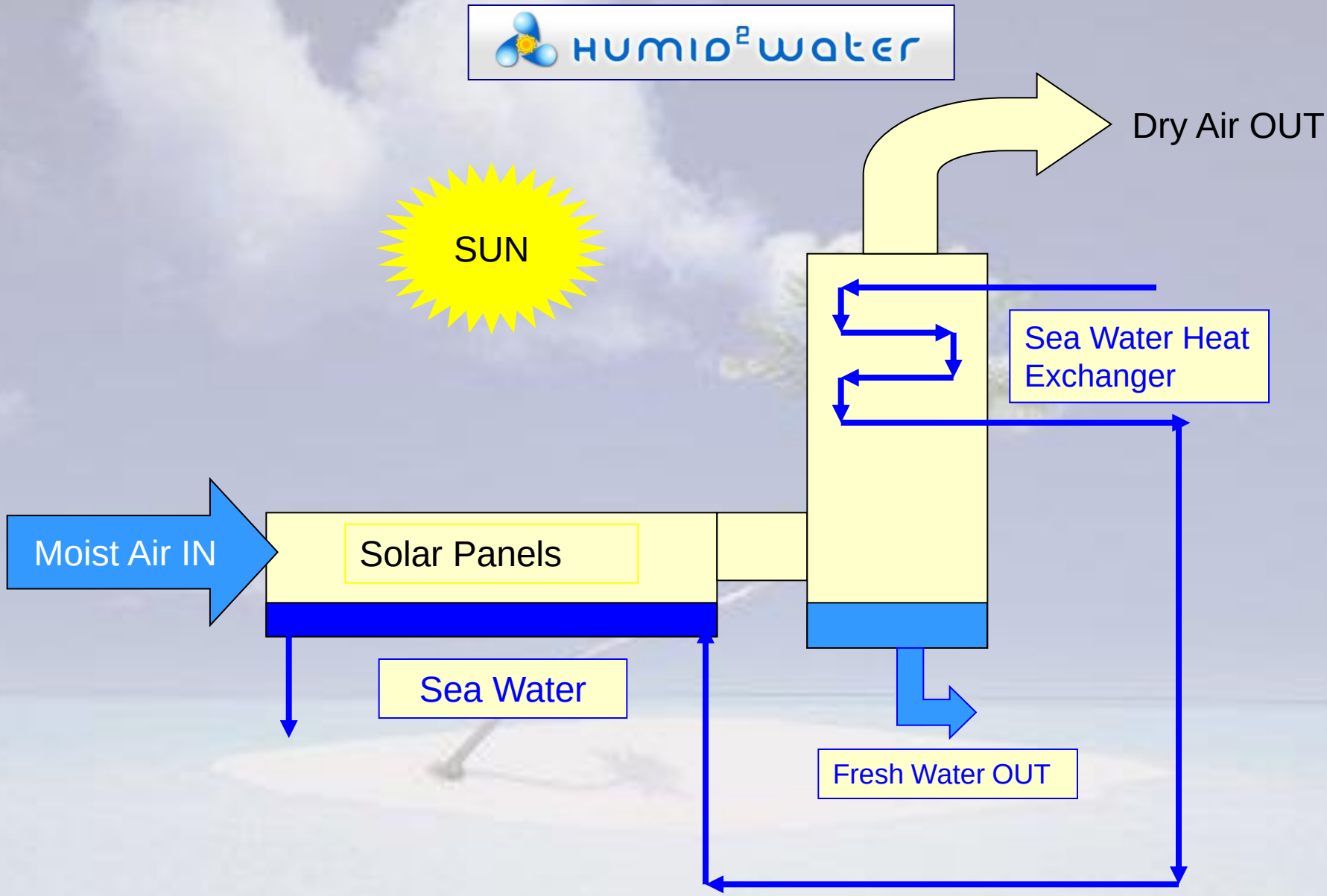
Ίδρυμα Προώθησης Έρευνας

ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ






Moist Air IN
Humid2Water Plant
Dry Air OUT
Fresh Water OUT


HUMID²WATER
Dry Air OUT
SUN
Sea Water Heat Exchanger
Moist Air IN
Solar Panels
Sea Water
Fresh Water OUT

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ

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Ίδρυμα Προώθησης Έρευνας

ΕΥΡΟΠΑΪΚΗ ΕΝΩΣΗ

humid² water

Meteorological Conditions under which the plant will be tested

- Season averages of Temperature and Relative Humidity for 2008
- Season averages for a 10 year period.

ΜΕΤΕΩΡΟΛΟΓΙΚΗΥΠΗΡΕΣΙΑ

METEOROLOGICAL SERVICE

Θερμοκρασία (°C) και Σχετική Υγρασία (%) - 08:00 και 13:00

TEX Temperature (°C) and Relative Humidity (%) - 08:00 and 13:00 LST

2008 Seasonal Averages

		Πάφος (Αεροδρόμιο)				Αθαλάσσα				Λάρνακα (Αεροδρόμιο)			
	Time	8:00		13:00		8:00		13:00		8:00		13:00	
Season		Θερμ. Temp.	Σχ.Υγ. R.H.	Θερμ. Temp.	Σχ.Υγ. R.H.	Θερμ. Temp.	Σχ.Υγ. R.H.	Θερμ. Temp.	Σχ.Υγ. R.H.	Θερμ. Temp.	Σχ.Υγ. R.H.	Θερμ. Temp.	Σχ.Υγ. R.H.
Winter	Average	11.9	64.0	17.5	53.0	7.6	76.3	15.6	46.3	10.9	69.7	17.1	48.3
	Maximum	17.5	89.0	21.8	78.7	12.9	92.7	20.2	87.7	14.9	90.0	21.0	81.7
	Minimum	5.4	39.7	10.0	30.0	2.6	49.0	8.1	26.7	5.7	50.7	10.5	29.0
Spring	Average	19.7	65.3	21.9	65.0	18.7	55.3	25.7	32.0	20.5	59.3	23.6	50.3
	Maximum	24.3	84.7	27.6	77.3	25.7	83.0	35.4	59.3	27.2	80.3	29.8	71.7
	Minimum	16.5	37.7	19.0	41.7	14.7	28.0	18.2	14.0	16.4	28.0	18.5	22.3
Summer	Average	27.7	71.7	29.6	73.7	28.8	51.3	36.2	25.7	29.2	64.7	32.0	53.3
	Maximum	30.1	83.7	31.6	82.7	33.1	75.7	40.4	48.7	33.2	87.0	35.6	71.3
	Minimum	25.6	44.0	27.2	59.7	25.3	23.7	32.1	12.0	26.7	30.7	29.4	29.7
Autumn	Average	23.4	62.7	26.3	62.3	20.4	69.0	27.3	39.7	23.3	64.3	27.1	53.3
	Maximum	26.0	80.7	28.9	79.7	23.2	88.3	31.6	74.0	26.5	84.7	30.8	71.3
	Minimum	18.5	46.0	22.7	47.7	16.3	47.3	20.9	26.3	18.4	39.3	22.5	32.3

Λάρνακα (1981 - 1990)

Ώρες	Μέση Θερμοκρασία αέρα © Εποχή			
	Χειμώνας	Άνοιξη	Καλοκαίρι	Φθινόπωρο
0200	10.3	14.5	23.8	18.7
0400	10.0	14.0	23.1	18.2
0600	9.8	14.5	24.0	18.4
0800	11.6	17.8	27.0	22.0
1000	15.2	20.0	28.2	24.7
1200	16.3	20.8	29.2	25.3
1400	16.2	20.9	29.9	25.2
1600	15.1	20.3	29.7	24.2
1800	13.4	19.0	28.5	22.3
2000	12.0	17.4	26.7	20.8
2200	11.1	16.2	25.6	19.8
2400	10.6	15.4	24.7	19.1

Λάρνακα (1981 - 1990)

Ώρες	Μέση Σχετική Υγρασία αέρα (%) Εποχή			
	Χειμώνας	Άνοιξη	Καλοκαίρι	Φθινόπωρο
0200	80.3	74.7	72.3	74.7
0400	81.0	74.7	73.7	75.0
0600	81.3	73.7	71.3	74.7
0800	75.3	67.0	67.0	63.7
1000	62.7	62.3	67.3	58.0
1200	58.3	60.7	62.7	57.7
1400	59.3	60.7	57.3	57.0
1600	64.3	61.3	56.7	59.7
1800	72.0	66.0	61.0	66.3
2000	77.0	70.3	67.0	70.7
2200	79.0	73.0	70.3	73.0
2400	80.0	73.7	72.3	74.3

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΔΕΣΜΗ 2008

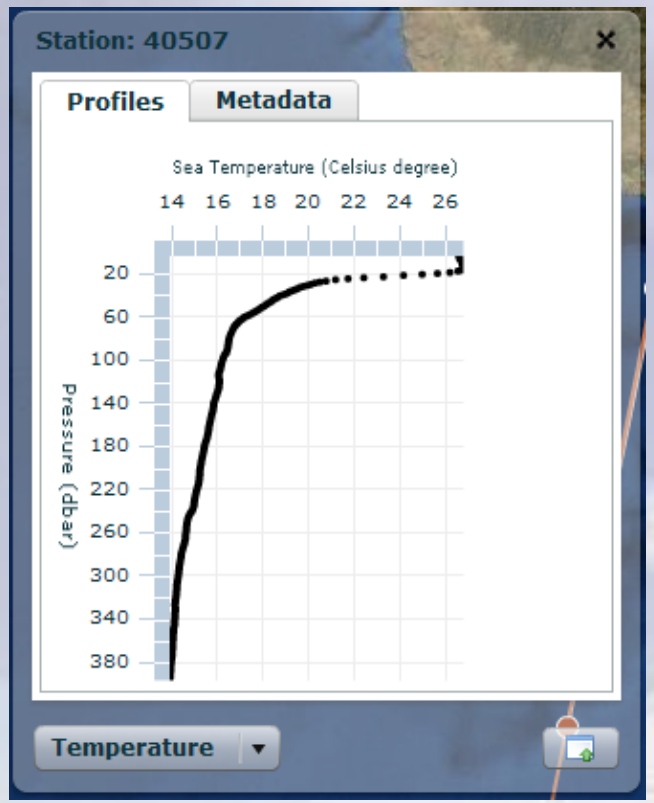
Ίδρυμα Προώθησης Έρευνας

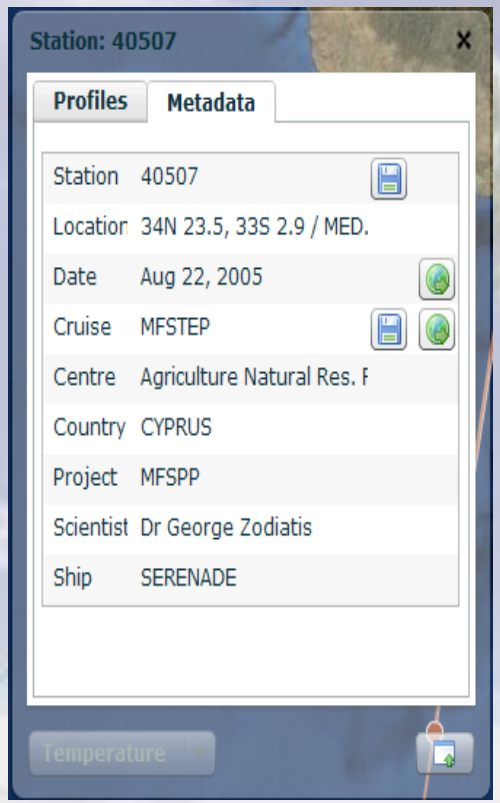
ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ

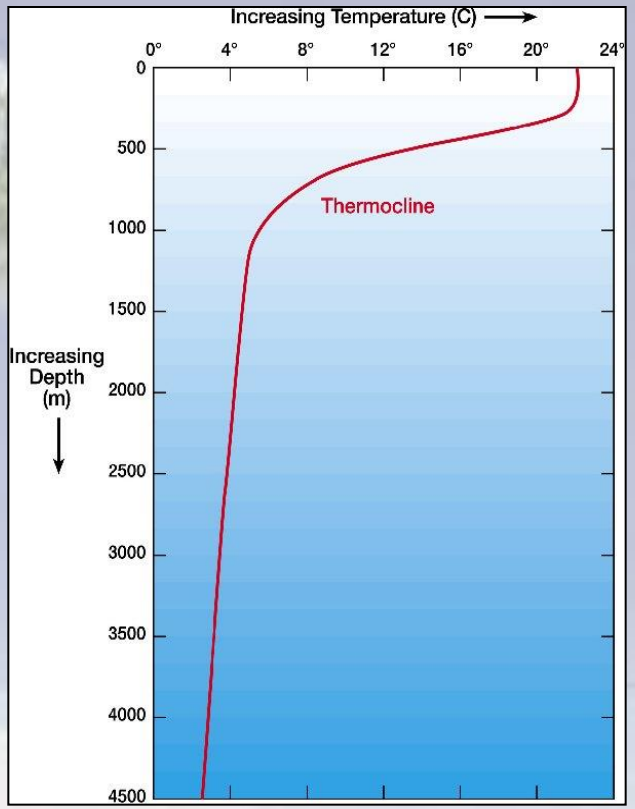
humid² water

Meteorological Conditions under which the plant will be tested

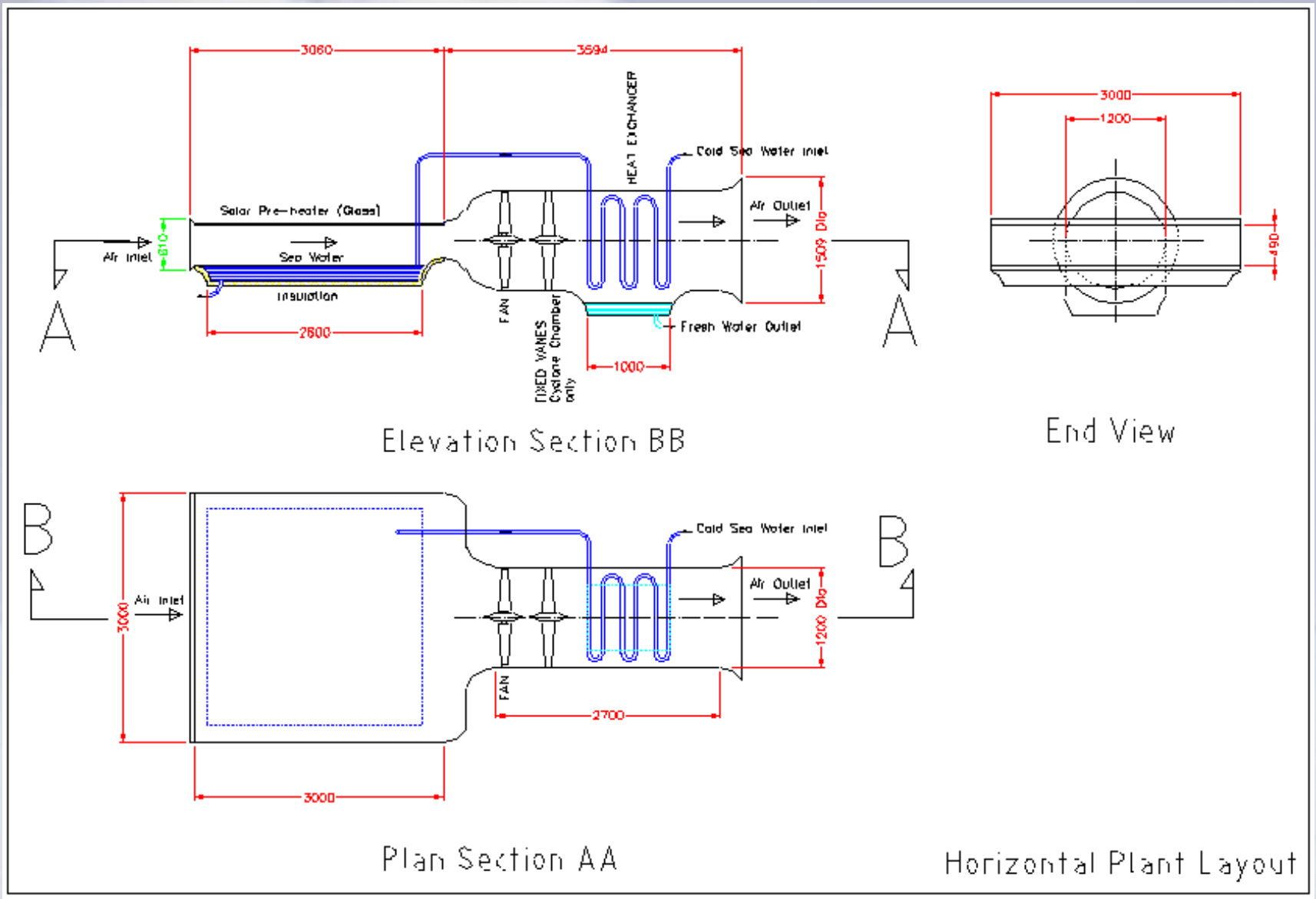
- Sea water temperature profiles (Cyprus Oceanographic Centre).







Design of the pilot plant



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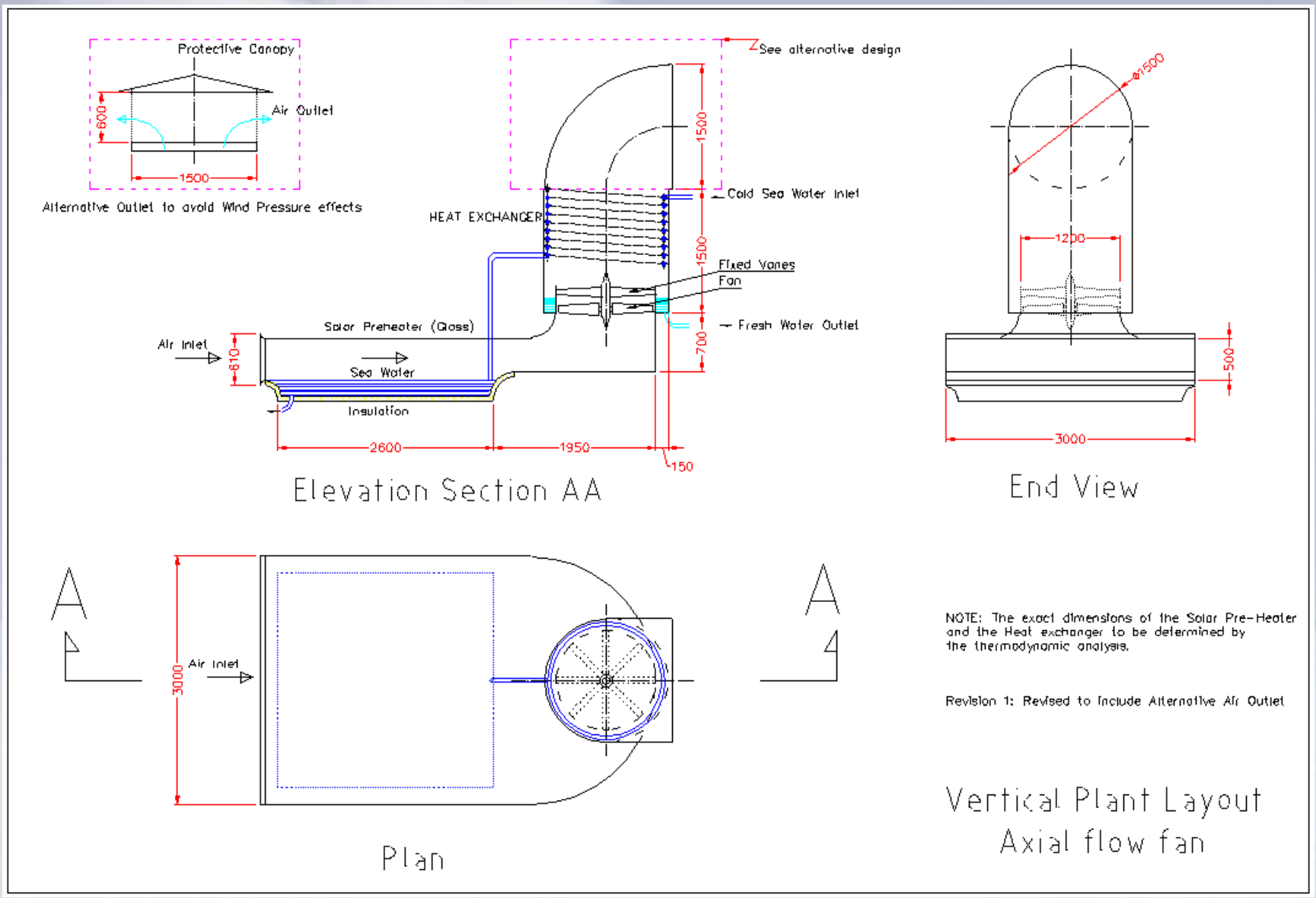

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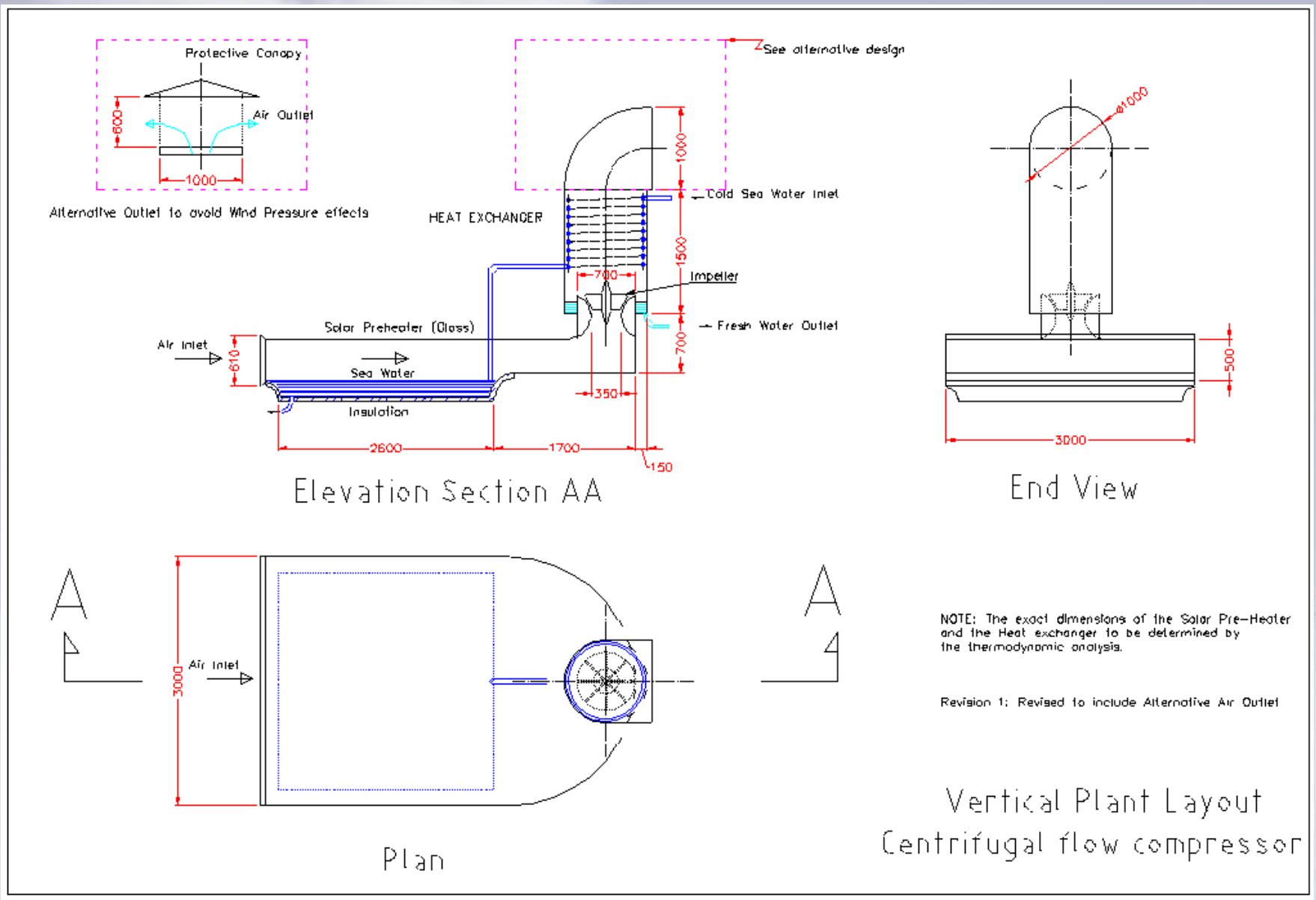

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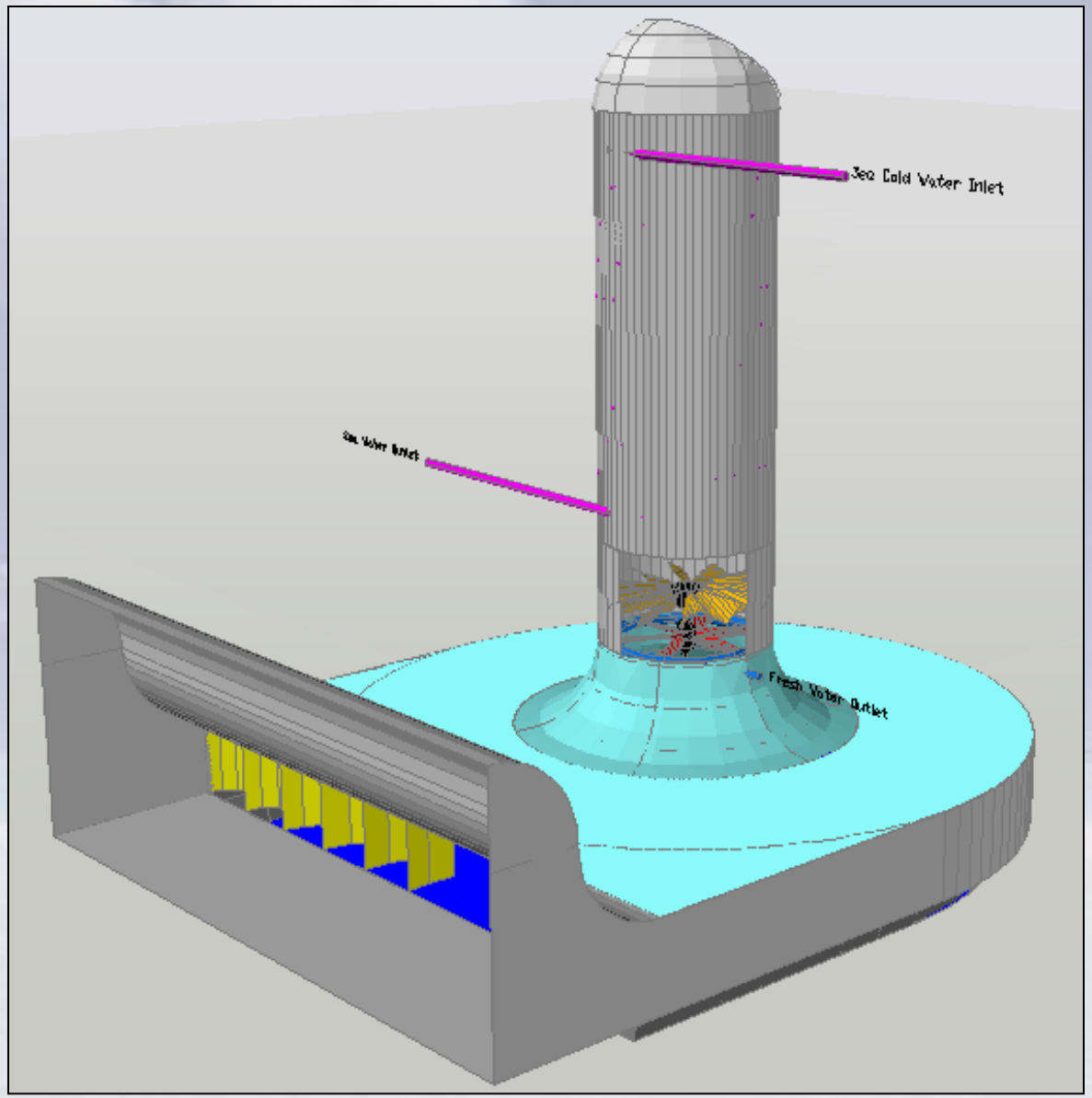

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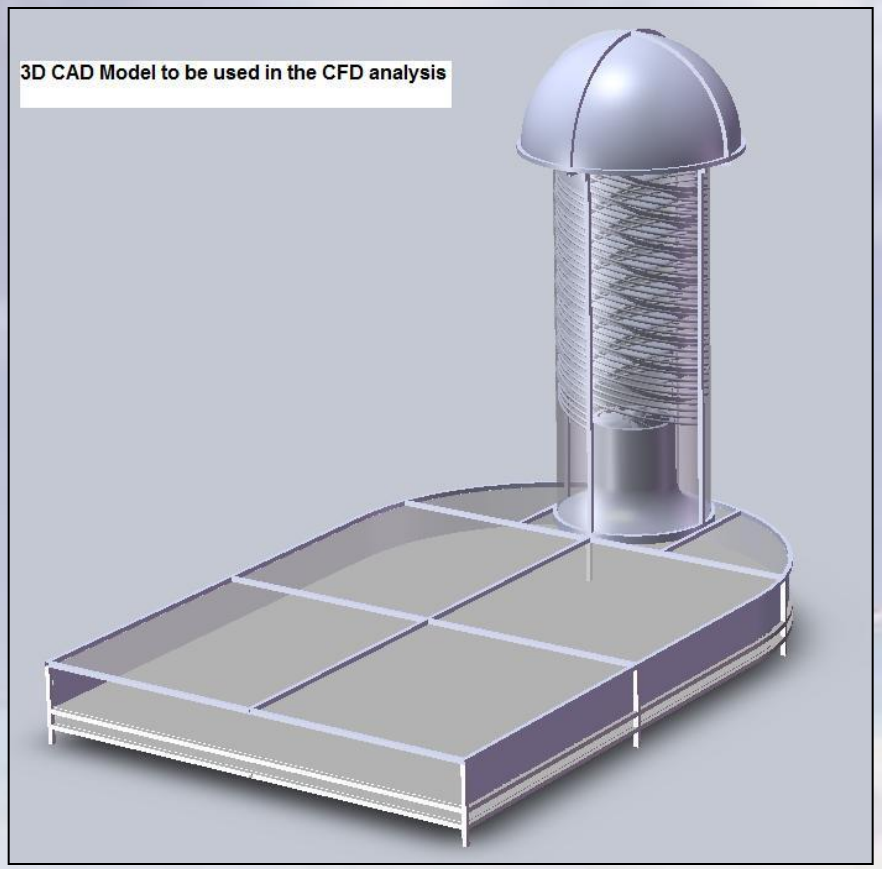
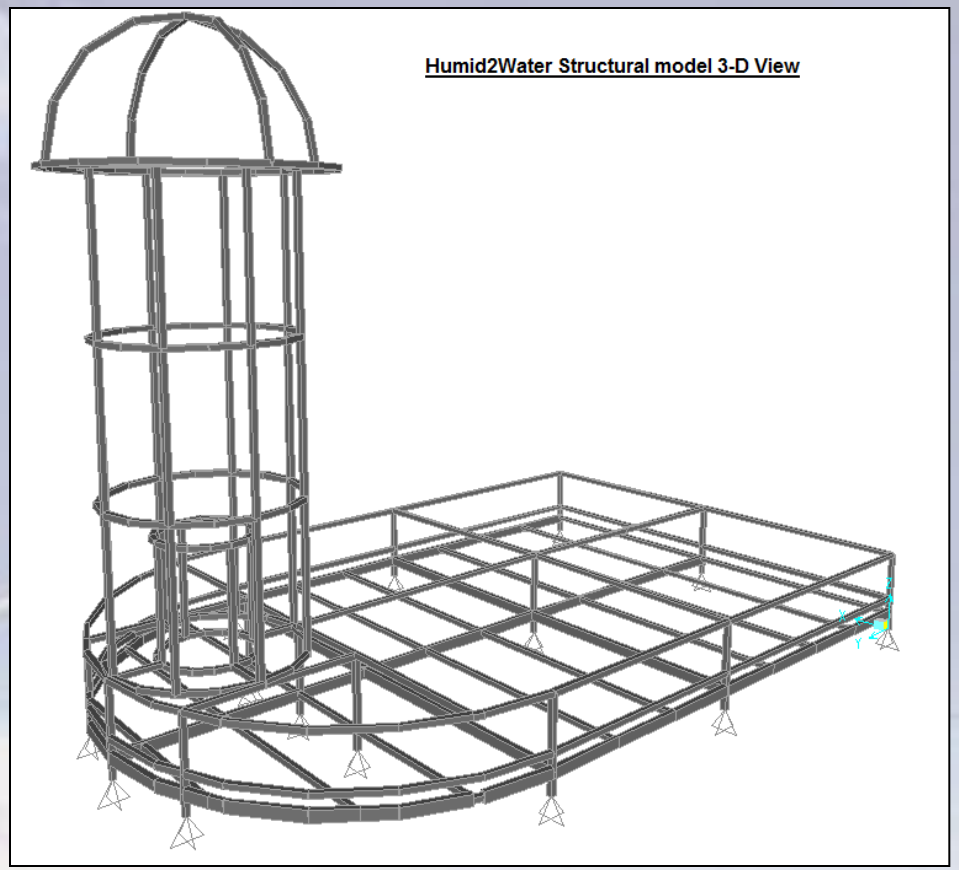
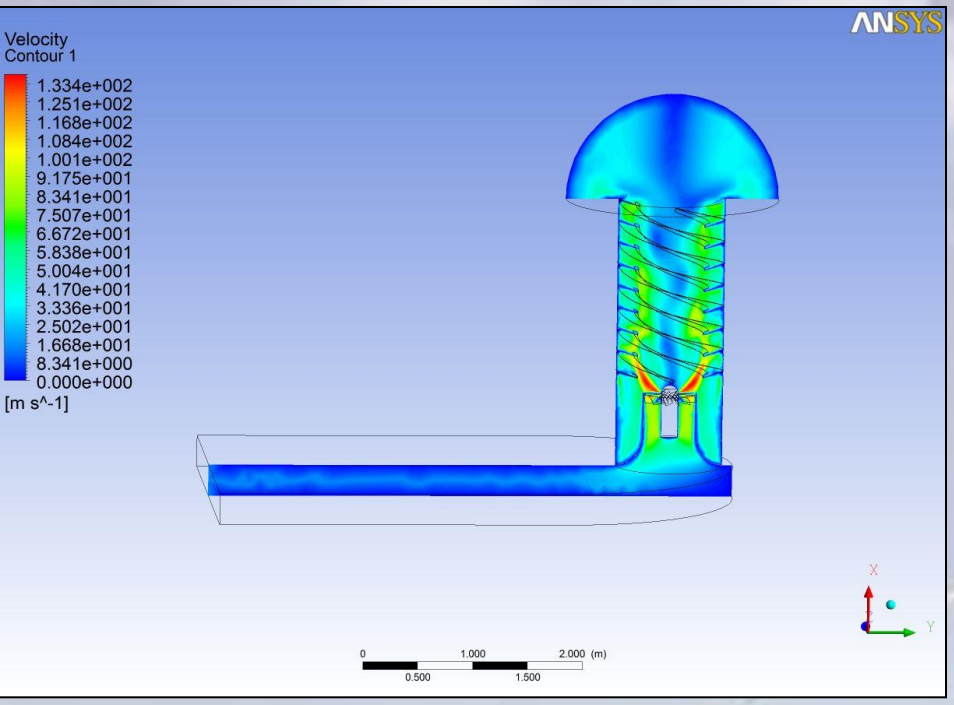
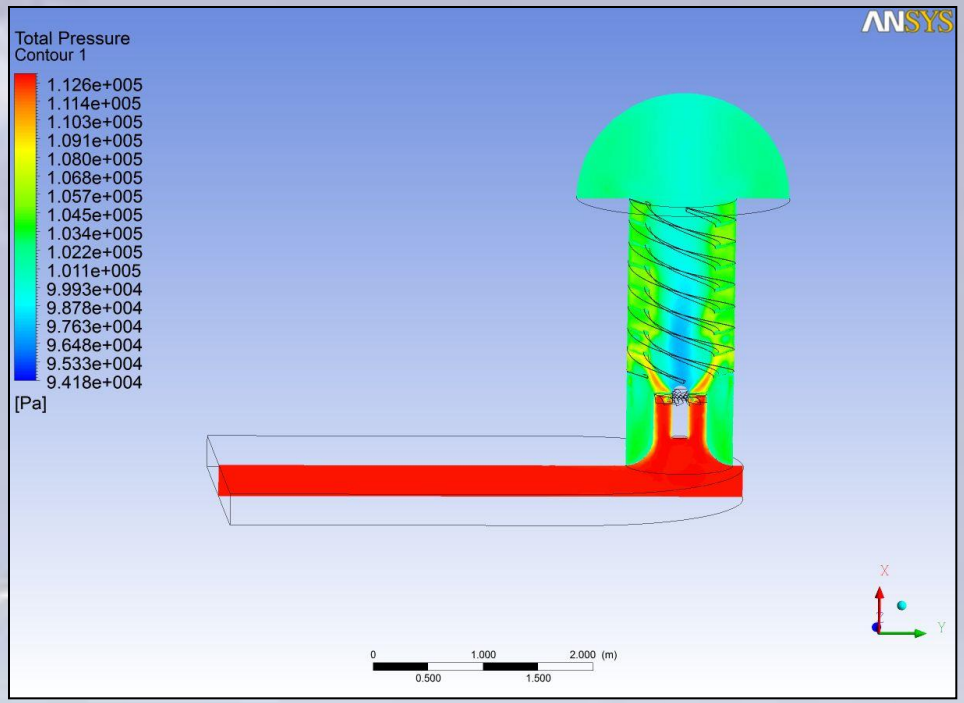




CFD Analysis of the air flow





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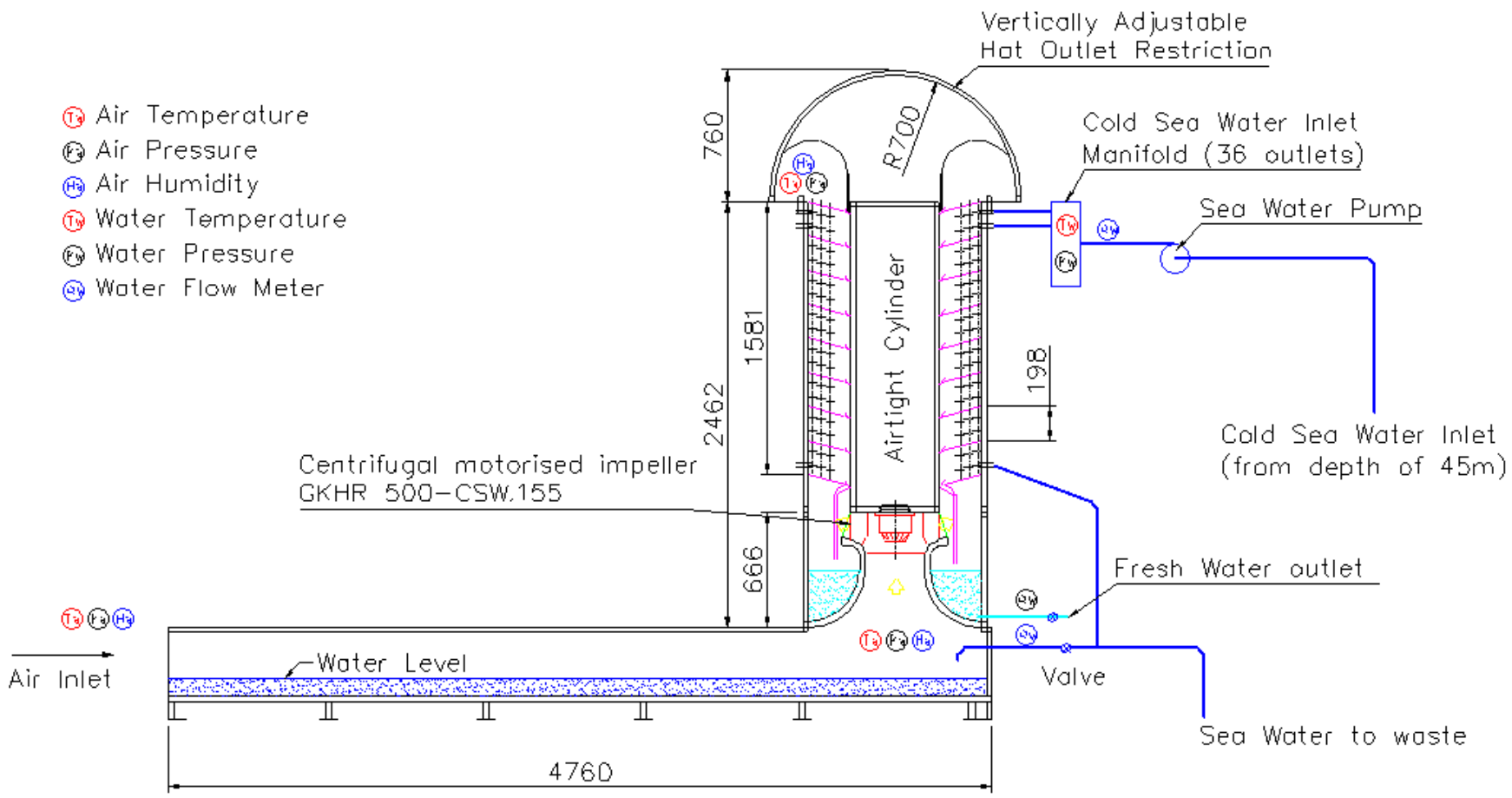
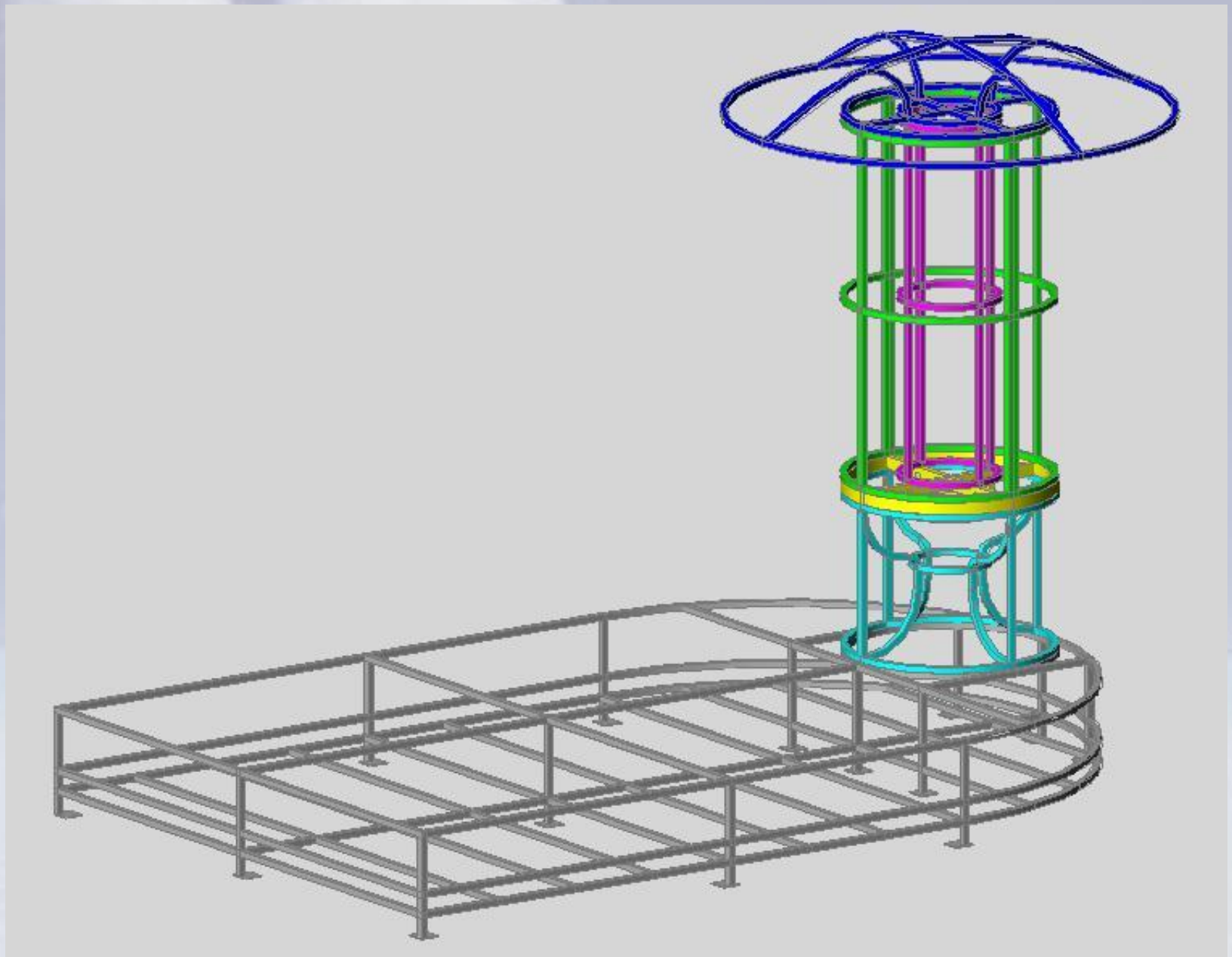


Humid2Water Centrifugal Impeller Pilot Plant Hydraulics & Instrumentation

Design of the pilot plant



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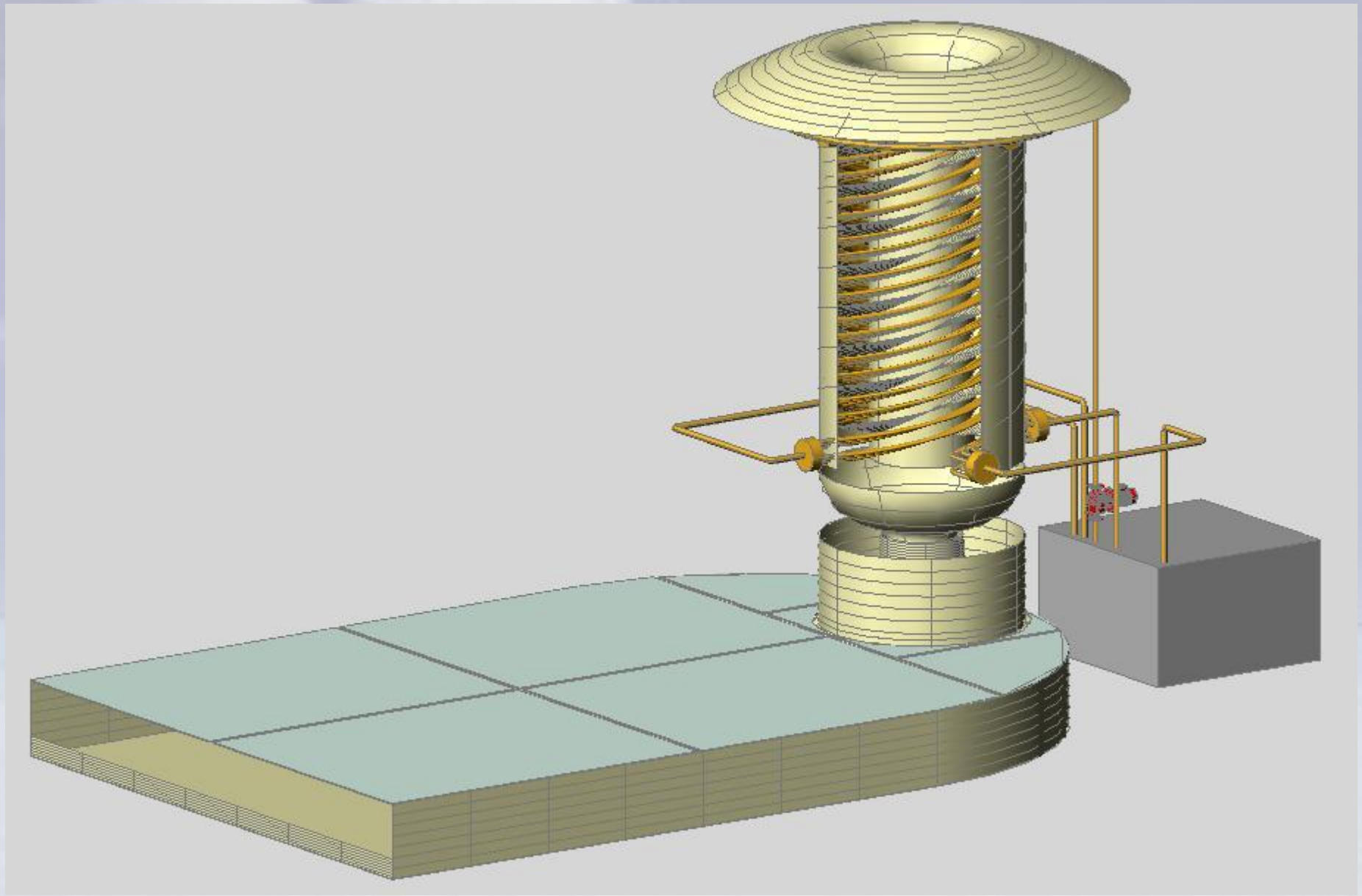

Design of the pilot plant


HUMID²WATER
Petros Kronis, Coordinator of research project Humid2Water, May 2011
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