



4 days Intensive Course on «Renewable Energy Technologies and Desalination»

Organization

The seminar is organized by the Centre for Renewable Energy Sources and Saving, in co-operation with the Agricultural University of Athens within ProDes Project.

Objectives

The purpose of this course is to provide graduate and postgraduate students with the latest technological developments in both technologies, RES and Desalination, and their matching. More specifically, the course will instruct students on the basic principle of desalination, wind, solar and geothermal energy and the state-of-the art of the most promising RES Desalination couplings.

The program includes a visit at the Energy Park, Wind Park of CRES (PENA, www.penaproject.gr) and to a demonstration RES Desalination plant of AUA. By the end of the course the students will obtain a relevant certificate of participation.

Venue

The seminar will be held at the premises of the Agricultural University of Athens, Central Building, Iera Odos 75, Athens www.aua.gr.

Time of the Seminar

The duration of the seminar is 4 days, from 29th of October to 3rd of November 2009.

Organizers

Eftihia Tzen, Wind Energy Dept., CRES, etzen@cres.gr

Prof. George Papadakis, Agricultural University of Athens, gpap@aua.gr

Dr. Dimitris Manolagos Agricultural University of Athens, dman@aua.gr

Promotion of Renewable Energy for Water Production
through Desalination

ProDes Contract No: IEE/07/781/SI2.499059

ProDes Project

www.prodes-project.org

Registration Form

SURNAME:	
FIRST NAME:	
LEVEL OF EDUCATION	BSc <input type="checkbox"/> MSc <input type="checkbox"/>
SPECIALITY	
CONTACT DATA	
ADDRESS	
CITY	
Postcode	
TELEPHONE	
EMAIL	

The participation is free of charge.

Registration is requested.

Please send the registration form to etzen@cres.gr or by

fax : 210 6603301



1st Session - Renewable Energy Sources

Thursday 29-10-2009, 9:00 – 19:00

9:00 - 11:00 Solar Energy – Photovoltaic Systems

I. Nikolettatos, Photovoltaic Energy Dept, CRES

PV Technology
Design of PV systems (grid connected, stand-alone systems)
Economics, Market

11:00 - 12:00 Solar Energy – Solar Thermal Systems

D. Chasapis, Solar Thermal Dept., CRES

Solar thermal systems
Economics, Market

Coffee Break

12:30 – 13:30 Geothermal Energy

Dr. K. Karytsas, Geothermal Energy Dept, CRES

Geothermal Systems- Low, Medium & High Enthalpy systems
Economics, Market

13:30: - 15:30 Wind Energy

S. Tentzerakis, Wind Energy Dept. CRES

Wind Turbine Technology
Design & Performance of W/T
Economics, Market

Break – Light Lunch

16:30 – 17:30 Hybrid systems for Desalination

Prof. G. Papadakis, Agricultural University of Athens

17:30 – 19:00 Environmental Aspects of RES Systems

I. Nikolettatos, E. Tzen, S.Tentzerakis, ΚΑΠΕ

Discussion

2nd Session - Desalination Technologies, RES Desalination

Friday 30-10-2009, 9:00 – 19:00

9:00 –12:00 Desalination Technologies

E. Tzen, Wind Energy Dept, CRES

The Water & the Water Management Need

Thermal Distillation Technologies

Multi Stage Flash, MSF; Multi Effect Distillation, MED
Vapor Compression, VC

Membrane Technologies

Electrodialysis(ED/EDR); Reverse Osmosis (RO)

Other Desalination technologies (Freezing, Membrane distillation, Humidification- Dehumidification, Solar stills, Hybrid systems, Cogeneration – Dual Purpose plants)

Technology Selection Criteria

Desalination Economics

Desalination Market

Analytical Design of Reverse Osmosis systems

Coffee Break

12:30–16:00 RES Desalination, Stand-alone Systems

E. Tzen, Wind Energy Dept, CRES

Desalination Technologies using Wind Energy

Mechanical Vapour Compression – Wind Energy

Reverse Osmosis – Wind Energy

Desalination Technologies using Solar Energy

Solar Thermal Distillation Systems

Reverse Osmosis - Photovoltaics

Other RES Desalination Applications (Solar Stills, Solar Membrane

Distillation, Solar Humidification - Dehumidification, Distillation - Geothermal Energy, Reverse Osmosis - Wave Energy)



2nd Session - Desalination Technologies, RES Desalination (cont.)

Friday 30-10-2009, 9:00 – 19:00

Break – Light Lunch

17:00 – 18:00 **Solar Rankine Cycle Systems for Desalination**
Dr. D. Manolagos, Agricultural University of Athens

18:00 – 19:00 **Environmental Aspects of Desalination Systems**
E. Tzen, Wind Energy Dept, CRES
Pre-treatment procedures
Post-treatment procedures
Brine Disposal Issues

Discussion

3rd Session - Practical Training & Tutorial

Monday 2-11-2009, 9:00 – 19:00

Practical visits and activities at CRES 3MW Wind Park and CRES Energy Park, Keratea, Attiki

Presentation of the 3MW CRES Wind park – Visit to a Wind Turbine
Dr K. Rossis, Wind Energy Dept, CRES

Presentation of CRES Energy Park
E. Tzen, Wind Energy Dept, CRES

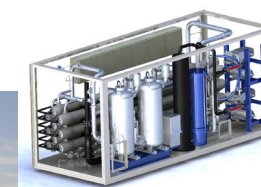
Visit to the demonstration units

- Biomass unit
- Geothermal unit
- Hydrogen unit
- Dual Axis Photovoltaic Mover
- PV Pumping unit
- Solar Desiccant Evaporative Cooling System

Practical Visit to the Autonomous Hybrid (PV/Wind) RO unit for seawater desalination

Tutorials / Practical Exercises

Design of the autonomous PV RO system in Aqaba, Design of the Hybrid (PV/Wind) RO of CRES



www.penaproject.gr

Tuesday 3-11-2009, 9:00 - 15:30

Visit to the Solar Rankine Cycle Desalination System of AUA, Marathonas, Attiki
Dr D. Manolagos, Agricultural University of Athens (AUA)

Tutorial

Design of the Solar Rankine Cycle Desalination System