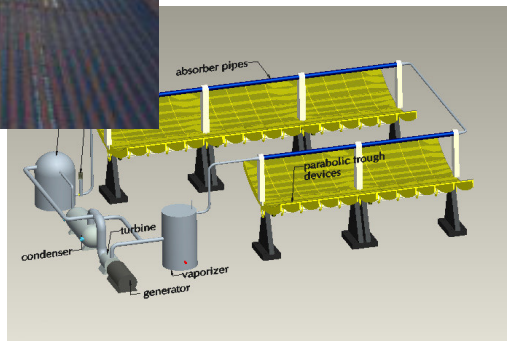
TEMO-STPP project
Hybrid Test rig for a Solar-Thermal Power Plant (STPP)

A cooperation project between
AECENAR e.V., VaEf e.V., TEMO e.K. and the Institute for Reactor Safety, KIT

Presented at Sommerschule – école d'été Bad Herrenalb, 6.-10.9.2010, by Samir Mourad

Outline

- Animation of test rig (10 min.)
- International Research Facilities
- Possibilities for Student Research works
- Further Information



1st alternative: Direct-Heating STPP

7 min. Animation
Download from
http://www.studienarbeit.piczo.com/

2st alternative: 2-circuit (oil+water) STPP

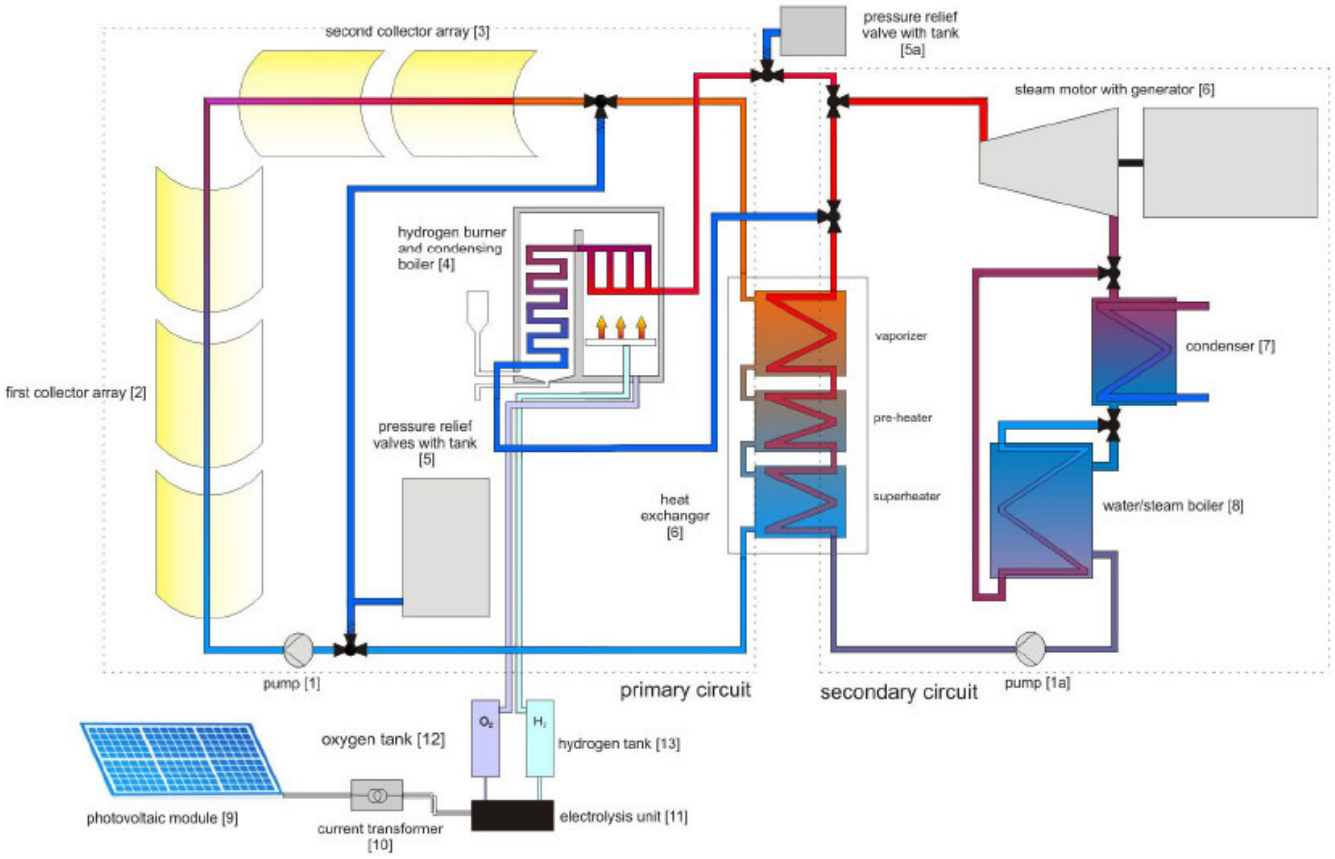
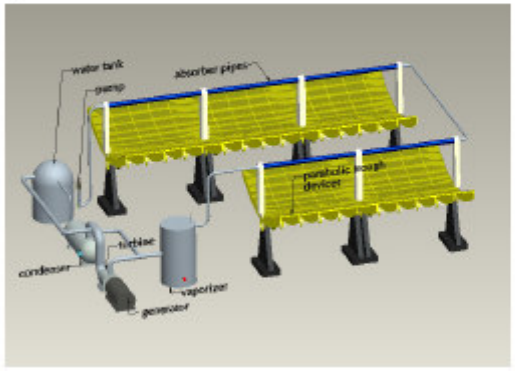


Figure 5-5: Sketch of the two circuit system

International Facilities – part 1

Karlsruhe, Germany

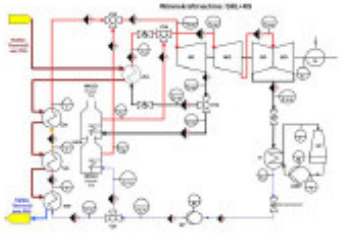
(VaEf, TEMO)

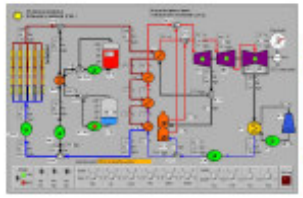


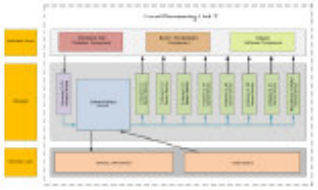
Computerbased Construction 2006 - 2009

Karlsruhe, Germany and **Ras Nhache, Lebanon**

(VaEf, TEMO) and (MEAE)

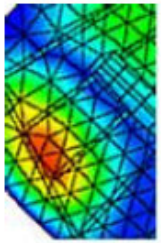






Development of Process Control System

International Facilities – part 2

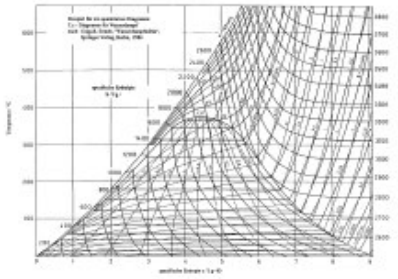


Numerical Simulation:

Ras Nhache,

Lebanon

(MEAE)



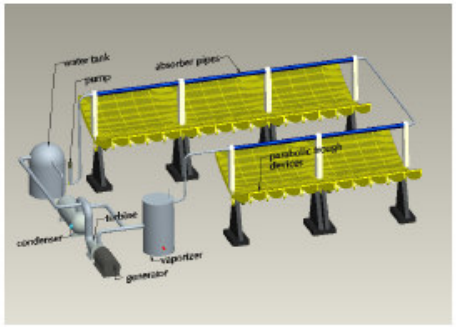
Computational Fluid Dynamics (CFD)

(Picture from Spain). Similar to this shall be inscha Allah the MEAE Test Stand

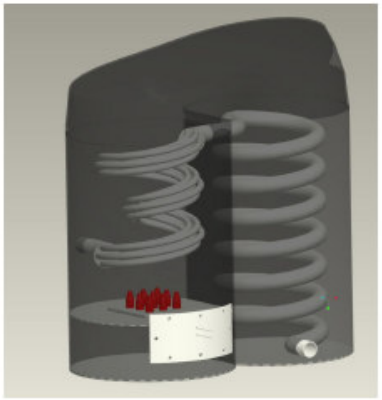
Isparta, Turkey

(Assembly Starting planned in August 2010)

Actual opportunities for student works – part 1



ProE Model of the Direct Heating Teststand



Heater (vaporizer) and Condensing boiler

In the context of the VaEf/MEAE - TEMO project „Modeling and construction of a two-circuit-STPP“, following work packages will be concerned as a student research project (master thesis or bachelor thesis):

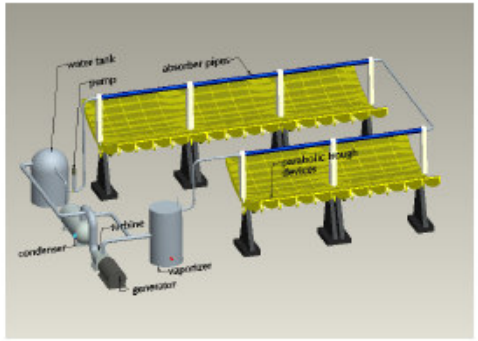
Student research project (Master thesis or bachelor thesis)

Detailed Construction and stress analysis of a Stadtgas-Heater for a Test plant for a Solarthermal Powerplant (STPP)

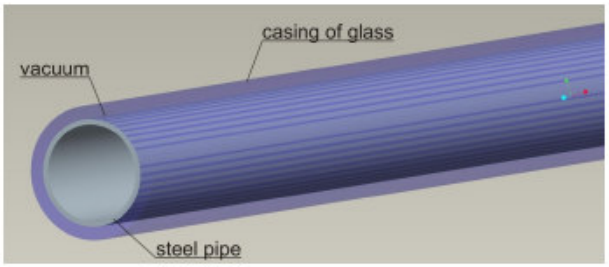
Based on the previous results of the project following operations have to be done:

1. Learning the programs Pro Engineer 2.0 and Abaqus
2. Refining the existing design of the heater and producing all relevant files for production
3. Defining material
4. Undergoing stress analysis with the finite element (FEM) tool Abaqus

Actual opportunities for student works – part 2



ProE Model of the Direct Heating Teststand



Absorption Pipe

In the context of the VaEf/MEAE - TEMO project „Modeling and construction of a two-circuit-STPP“, following work packages will be concerned as a student research project (master thesis or bachelor thesis):

Student research project (Master thesis or bachelor thesis)

Modeling of water flow through an solar absorption pipe in a direct heating test rig for a Solarthermal Powerplant (STPP)

Based on the previous results of the project following operations have to be done:

1. Learning the program FreeCFD
2. Modeling of the absorption pipe, which is from an Austrian company based on the former ProE model
3. Defining material
4. Undergoing CFD with the linux based program FreeCFD

Keywords: CFD (Computational Fluid Dynamics), Solar energy

Further information

For further information concerning the TEMO-STPP project see:

www.vaef.de (Verein für alternative Energieforschung e.V., Karlsruhe)

www.aecenar.com/institutes/meae

(Association for Economical and Technological Cooperation in the Euro-Asian North-African Region e.V. (AECENAR),

Karlsruhe/Germany and Ras Nhache/Lebanon)

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