

# Concept for Optimization and simulation of renewable energy parks with desalination

\*D. Buschert,

B. Bitzer

South Westphalia University of Applied Sciences, Campus Soest, Germany

[Buschert@fh-swf.de](mailto:Buschert@fh-swf.de)

[Bitzer@fat-soest.de](mailto:Bitzer@fat-soest.de)

*Abstract* – In the next years the consumption of water and energy will rise. At present time it is already very difficult to supply all persons with enough water and energy. A lot of people die on thirst, especially in the third or the fourth world. Furthermore a lot of freshwater is contaminated with health hazard materials or excrements, so this water cannot be use for drinking or irrigating the fields to produce crop plants. Furthermore there are a lot of people who do not have a power supply. At this point this future project is scheduled to tackle this problem. This project should demonstrate the possibility to combine a heat generator, for example a renewable energy park which produces waste heat, with a water desalination unit to produce water and energy independent from each other. This can be delivered to consumers to provide them with the needed water and energy.

## SUMMARY

During the energy production in a power plant a lot of waste heat is produced which is in the majority of cases unused. This waste heat can be used to desalinate saltwater in a water desalination unit. Our decision is to use the unit from the firm Terrawater from Germany, because it works with a thermal process. The saltwater or brackish water is evaporated. So the produced energy and the produced water can be used independently from each other.

For a secure operation of this combination different modules have to be combined. These modules can be seen in figure 1.

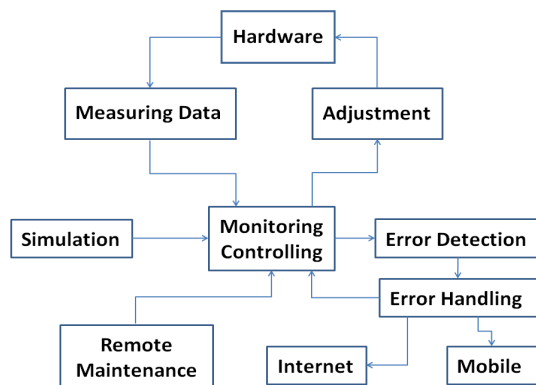


Fig. 1: Scheme of the needed modules for a secure combination of the power plant and the desalination unit

At first a simulation programme has to be coded to find the best combination of produced waste heat and the mode of operation of the water desalination unit. For this simulation different physical aspects like the temperatures of the (waste) heat and the raw water or the pressures inside of the water desalination unit have to be analysed and evaluated. With this information a control programme can be written, which works together with the simulation programme and this programme can adjust the water desalination unit and the waste heat generator. This generator can be a power plant or a solar thermal panel. The raw water is heated by the waste heat using a heat exchanger. So the efficiency is very high and the produced (waste) heat is expedient used.

Furthermore the control programme can be combined with a monitoring programme to monitor the functionality of this combination. Problems or faults can be sent via internet or a mobile telephone to the maintenance service or to the owner of this construction. So a fast deletion of errors can be established.