



PREP

Promotion of Resource
Efficiency Projects

2nd Topic: Water and Energy

Fields of Interest:

- Desalination of Salt Water

A nearly inexhaustible amount of salt water on earth can be found, but the availability of fresh water from rain and fossil resources is very limited. Thus the desalination of salt water for producing fresh water can be a good answer to this disparity. However, the desalination of salt water requires a high energy input. By using multi-staging steam plants and reverse osmosis plants, it is possible to reduce the energy requirement.

- Desalination of Brackish Water

Next to desalination of salt water, there is also the possibility of desalination of brackish water. In many regions brackish water suitable for desalination is easily accessible. For small production of fresh water, reverse osmosis is a common method, because it can be operated in remote areas without being connected to the grid, does not need thermal energy, is low maintenance and makes high portable water outcome possible. Currently mainly diesel generators are used for generating the necessary energy.

- Water Pumping and Irrigation Systems

For water being the most crucial requirement especially in dry regions, there is usually the need for pumping deep ground water. Many different methods like hand pumps or solar pumps for achieving an efficient way of water pumping have been developed. Especially in hot regions the use of sun energy is a good solution. The pumped water can be used for drinking but as well for watering cropland. Next to the pumping also the irrigation system can be run with renewable energy.

- Reducing Water Requirement by Using Cycle Systems

Present energy systems consume a high amount of water along their entire resource chains. The extraction, transport and treatment of resources as well as their use for traditional power generation need large amounts of water. Cooling water requirement is extremely high and exceeds the needs of other water requirement by industry and for fresh water by far. A 1000 MW thermal power plant needs approx. 40 cubic meters per second of cooling water. Usually river water is used but also certain amounts of fresh water are necessary. One option to reduce water requirement is to use effective water cycle systems.

- Reuse of Waste

In the developed world, nearly every city has its own sewage plant, treating household and industrial waste water. The treated water is discharged back into river and lake systems. What remains is an organic / inorganic mixture of sludge. The issue is how to dispose of this residue. Usually, sewage sludge has been used as an agricultural fertilizer, burned to produce energy or dumped on landfill sites. A more sustainable solution can be the creation of biogas out of sewage sludge.