



Effects of climate change on water demand and water availability for power plants – examples for the German capital Berlin

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Numerous power plants in Europe had to be throttled in the summer months of the years 2003 and 2006 due to water shortages and high water temperatures. Therefore, the effects of climate change on water availability and water temperature, and their effects on electric power generation in power plants have received much attention in the last years. The water demand of a power plant for cooling depends on the temperature of the surface waters from which the cooling water is withdrawn. Furthermore, air temperature and air humidity influence the water demand if a cooling tower is used. Beside climatic parameters, the demand for water depends on economic and technological factors as well as on the electricity demand and the socio-political framework. Since the different systems are connected with certain levels of uncertainty, scenarios of socio-economic development and climate change should be used in analyses of climate change on power plants and to identify adaptation measures.

In this presentation the effects of global change, comprising technological, socio-economic and climate change, and adaptation options to water shortages for power plants in the German capital Berlin in the short- and long-term are analysed. The interconnection between power plants, i.e. water demand, and water resources management, i.e. water availability, is described in detail. By changing the cooling system of power plants from once-through system to closed circuit cooling systems and/or increasing their efficiency the vulnerability of power plants can be reduced considerably. So the electricity production becomes much more robust against effects of climate change and declining streamflows due to human activities in the basin under study. Notwithstanding of the adaptation options analysed for power plants in Berlin economic costs are expected due to declining streamflows and higher water temperatures.