

## Cross border Climate Change Impacts, part 2: Energy security

Tuesday, 3 November 2015  
15:30 – 17:00, Room I

### DRAFT ABSTRACT

Large-scale power failure is one of the major risks, both with respect to the potential economic damage and the disruptions to everyday life with possible casualties as a result due to cascade effects. The chances of this happening depend on the region. Particularly in the case of heatwaves with a high demand for electricity to run air conditioning systems, in combination with low river water levels, which become too warm under these meteorological conditions. Such a situation may force a shutdown of power plants that extract their cooling water from the rivers. During the European heatwaves of 2003, 2006 and 2009, several power plants had to reduce their generation levels due to a shortage of cooling water. The continued discharge of water after having been used for cooling, in these cases, leads to a further rise in water temperatures which, in turn, poses a threat to water quality, public health and nature.

Heat and electricity are no longer generated only in large energy plants, but also on a smaller scale and distributed over a large area. Examples of local scale production of energy are from wind and photo voltaic (solar). These are autonomous changes driven either by mitigation goals or by geo-political arguments. These weather dependent energy sources may have disrupting effects on balancing the power grid. Therefore, technological advances could be promoted, such as ways to store electricity or introduce more flexibility into the system, so that supply and demand can be better matched. On the energy storage part, this may be realized by more hydropower facilities. Whereas on the user part the introduction of smart meters, in combination with the possibility of variable hour tariffs for small-scale users may be a way to handle supply and demand.

The internationalization of the power grid infrastructure, generation and market is an important development that affects the vulnerability of the power supply. The international interwovenness has the advantage of increasing the redundancy within the network and of reducing the risk of failure. A disadvantage would be that failure of the power grid in one of the connected countries may also cause problems in one or more of the other countries.

In this session vulnerabilities, risks and opportunities of the energy system in relation to climate change, autonomous changes in the energy sector and to coupling the energy networks on various scales will be discussed.