



## **A Why-Because Analysis of the European Electricity Blackout of 4 November, 2006**

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In the night between the 4th and 5th of November 2006 ca. 15 Million people throughout Europe were cut off from electricity supply for a few minutes up to several hours. In order to let a cruise ship pass, a high voltage line across the river Ems was shut down. Shortly afterwards, additional wind power was fed into the grid. As a consequence another line, through which some of the power was re-routed, was overloaded and shut off automatically. In a cascade other lines also shut off within a few seconds of each other. This split the European power grid into three sections, one western section with abundance of power, and a north-eastern and south-eastern section with too little power. This caused the frequency in the western section to rise to about 50.4 Hz, and in the eastern sections to drop below 50Hz, precluding a quick reconnection of the subnets. In the western sections, generators were cut off from the net, and pumps in pumped-storage power stations were activated, and in the eastern sections, additional generators were turned on and some users had to be cut off from the grid temporarily. We perform a Why-Because-Analysis of the causes.