

## Dr. Dirk Witthaut

Affiliated with the Institute of Energy and Climate Research - Systems  
Analysis and Technology Evaluation (IEK-STE)

Helmholtz Young Investigators Group: E3-NET efficiency, Emergence and  
Economics of future supply networks

„Global supply and communication networks are the technical backbone of society. Can we identify and understand the risks in such complex systems in a world that is getting more and more interconnected?“

### Research project:

The development of a sustainable energy supply poses an enormous challenge for the operation of the electrical power grid and other supply networks. Billions of euro have to be spent on new transmission lines and storage infrastructures. But still extreme loads are becoming more

frequent and novel systemic risks emerge. To face these challenges, we need a better understanding of the dynamics and stability of complex networks on all scales. We develop and apply new methods to analyze and optimize supply networks using modern tools from

statistical physics and nonlinear dynamics. A main goal of our group is to unify the model-driven approach of statistical physics with advanced simulations incorporating technical, economic and political developments.

### What is/has been the greatest challenge as head of a young investigators group:

Recruiting talented young scientists is essential for a successful group. And it's not easy...

**Start of funding period:** 01.08.2014  
**End of funding period:** 31.07.2019  
**Budget:** ~250.000 € per year  
**Staff:** 2 PhD students, 1 Postdoc

**University affiliation:** **University of Cologne**

**Cooperations:** Max-Planck-Institute for Dynamics and Self-Organization, Göttingen  
Potsdam Institute for Climate Impact Research, Potsdam  
Jacobs University Bremen, University of Aarhus