What happens after the lights go out? Compound and Cascading hazards, and their impacts on highly renewable systems

Organisers: Hannah Bloomfield, Nathan Agarwal and invited speakers

Recent international review articles and national climate risk assessments have pushed for an increasing focus into research onto compound and cascading events. There is a growing body of work on the spatial and temporal compounding of meteorological hazards, but less work that links these *hazards* to specific compound *impacts*. In this session we will explore how compound meteorological events could be drivers of major energy system failures, and how this could trigger cascading failures across critical infrastructure sectors, and therefore impacts on society. We will start by exploring some of the typologies of multi-hazard risks from a climatological perspective, then we will consider how this could lead to cascading failures. The final two talks will consider the impacts of chosen mitigation pathways (e.g. electrification of energy grids, and green fuels) and potential adaptation solutions in the form of early warning systems for decision making.

Talk 1: Nathan Agarwal (Johns Hopkins University) Compound Meteorological Drivers of Major Energy System Failures. Defining the typology of compound events and some key 'high risk' compounds for the energy sector.

Talk 2: Chris White (University of Strathclyde) How can extreme weather events lead to cascading impacts across sectors?

Talk 3: Bryn Pickering (University of Cambridge & ARUP) How might our journey to net-zero lead to different impacts of compound/cascading extremes?

Talk 4: Dan Suri (UK Met Office) How can we prepare for cascading failures? An example from UK civil contingency planners.

The focus of these talks will be Europe, but in the followup discussion we will consider how the compounds and cascades of interest may be different in low and middle income countries, and how different groups of people may experience these events differently.