PAUL SCHERRER INSTITUT

Technology Assessment Group
Laboratory for Energy Systems Analysis
Paul Scherrer Institut
5232 Villigen-PSI
Switzerland

Master thesis topic: Uncertainty in electricity generation mixes

The electricity grid draws from a number of different generating technologies, like coal, nuclear, solar PV, etc. However, our current estimates of what the relative shares of different generating technologies in the grid mix are based on rough estimates, but good data is available from other sources. In addition to improving the existing values, it would be nice to better understand the shapes of the relative share uncertainty distributions (i.e. nuclear is on average ~40% of generation in Switzerland, but can vary by quite a lot depending on time of day and season), to see what the correlations are between different technologies (e.g. does nuclear always stay at a fixed percentage, or is it ramped up and down based on renewable generation). This work would be very important in improving our understanding of the environmental impacts of electricity generation and consumption.

- Key questions:
  What do the actual distribution functions for different generating technologies look like? How different are they from our current estimates?
- What are the correlations between different technologies? Can we include these correlations when performing Monte Carlo analysis when doing Life Cycle Assessment calculations?
  Do the patterns in generation change over time? Can we project future uncertainty scenarios for grid mixes?

Interested students are encouraged to contact Chris Mutel* for more information. Please include a short academic background on yourself including study programme, course list, and current grades.

*More information:
Email: **christopher.mutel@psi.ch**
PSI group webpage: www.psi.ch/ta/