

Guest lecture with breakfast



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Titel: **An Efficient and Tight Model for Nuclear Power Plant Constraints in Flexible Operation**

Date: Friday, 06.06.2025 at 08:30 am

Place: Institute of Electricity Economics and Energy Innovation
Multifunktionsraum IEE (HS02024), Inffeldgasse 18/II

LECTURE

Nuclear power plants have historically been inflexible generators, designed for baseload operation, generating a steady output of high power at low variable cost. This conflicts with the flexibility demands that high renewable penetration impose over power systems. However, it is possible, as some countries like France demonstrate daily, to operate nuclear power plants in a more flexible manner to perform load-following operations. Due to the unique characteristics of nuclear reactions as heat sources, reactors are subject to certain constraints, such as Xenon transients, which require specific modeling to represent their behavior. We present a tight formulation for this constraint, which enhances existing literature formulations. We also present novel formulations for modeling the minimum stable time problem with more nuance. We finally provide a case study based on the RTS-GMLC to show the increase in computational efficiency of our improved formulation and the advantages presented by our novel formulations.