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ELECTRICAL GRID SIMULATION AND MODELING

... with know-how for the entire grid

Electrical grids are the backbone of economic and social development. The rising number of distributed suppliers of renewable energy is prompting a restructuring of the electrical grid since conventional, unidirectional energy flows are turning into bidirectional energy flows. The electrical grid is thus being operated at stability limits for which it was not designed originally. On the one hand, this can overload equipment. On the other hand, grid instability, such as frequency and voltage instability, can arise and certainty of supply is no longer guaranteed.

Grid modeling and simulation with new static and dynamic grid models is central to guaranteeing a certain and reliable energy supply nonetheless.

Your Benefits

We model and simulate electrical grids. This makes it possible to identify undesired grid conditions during planning and operation as well as in future situations and, if necessary, to ascertain appropriate fields of action. To do so, we model load flows and short circuits and run dynamic simulations.

Our services enable you to:

– optimize an electrical grid by minimizing losses in the grid and optimizing costs and maximizing the electrical grid’s transmission capacity;
– provide information on grid stability when, for instance, unexpected disturbances occur in the grid;
– define actions needed to counter grid instability;

Images: Dr. Thoralf Winkler, Fraunhofer IFF
We additionally derive potential counter measures for such stability problems. We can simulate the following disturbances:

- short circuits of any type,
- line disconnections,
- generator disconnections,
- load shedding and
- other disturbances such as grid component overload.

In addition to static and dynamic analyses of grids, we also develop simulation models and simulate new grid components for evaluation. Grid components are modeled using flexible, block-oriented programming in our simulation system. The advantage is the ability to connect a developed model seamlessly with any existing grid model and test it directly in various scenarios, e.g., new protective equipment for smart grid stability. We additionally validate and optimize models.

We optimize the time and frequency domain of the models developed. In the process, we might optimize the parameters for dynamic grid elements or the parameters for controllers of power machinery.

Please contact us if you are interested in our services for grid simulation. Our experts would be happy to provide you assistance.