

Grid stability thanks to precise forecasts

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Approximately five percent of the electricity sent across borders in Europe flows through Switzerland (e.g. power from Germany or France to Italy). Swissgrid plays a key role here by ensuring that the electricity transmissions run smoothly. However, a small amount of electricity is lost along each kilometer of power lines. In order to offset these losses, Swissgrid buys electricity on the spot market up to 16 hours in advance of projected shortages.

Up until now, experts at Swissgrid have calculated the anticipated transfer losses on the basis of calendar days, weather forecasts, and grid operator plans in neighboring countries. The new algorithm developed by Siemens researchers derives the projected transfer losses directly from [electricity](#) consumption forecasts. Along with data from the past, the system also uses variables such as current load flows, power generation figures for renewable sources, weather data, and water levels in pumped-storage hydroelectric power stations. The error rate for consumption forecasts at Swissgrid now stands at 11 percent; the new algorithm will improve this figure by one percentage point, which translates into savings of approximately 200,000 euros per year.

Siemens' forecasting method is based on an artificial neural network - software that functions in a manner similar to the human brain. Siemens CT develops [neural networks](#) in order to calculate the behavior of highly complex systems, which might include wind farms, gas turbines, or even stock markets. Based on historical data, the software learns to make the most accurate predictions possible. The system's learning capability makes it particularly suitable for adjusting grid operation to the fluctuating power outputs associated with [renewable energy sources](#). The most efficient use of existing power networks is a building block of the energy revolution.

Source: Siemens

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