A Question of Reaction

Dear Reader,

A study published in May 2021 written by the Fraunhofer institute IES predicts there being almost four million electric vehicles (BEV) on Germany's roads in 2030, which will lead to an additional electrical power requirement of approximately 11.6 TWh. The majority of energy providers consider the issue of charging a rapidly growing number of electric vehicles as feasible and solvable, even in the future, since not all vehicles will be connected to the grid at the same time. Despite their confidence, this will certainly require the perfect interaction between producers, consumers, storage facilities and an intelligent, highly reactive grid; something that does not yet exist.

Due to its very nature, a critical mass of electric vehicles is accompanied by increasing requirements on the grid and its control technology: This results from the ratio of volatile renewable energies in the energy mix, whose share needs to be expanded extremely rapidly, if the demands of a green, Fridays-For-Future-compatible and all-electric society are to be met. The impact on the grid is amplified by the imminent shutdown of coal-fired power stations and the loss of their stabilizing generators. This is solvable but requires considerable effort.

The easiest way to achieve this would be to include the storage capacity of electric vehicles. A stabilization of the grid is not possible without either a few very large systems or a large number of small buffers. In this respect, bidirectional charging is gaining huge importance as an essential balancing element. Both BEVs and plug-in hybrids could be used for this. However, the sheer scale of the number of participating storage systems to be coordinated according to their availability, state and characteris-

tics is daunting. In addition, research and development needs to be conducted for many other concepts ranging from pump storage power stations for wind power generators to static large batteries.

It will also be interesting to see where (green) energy production will settle in the field of tension between minimum production and maximum consumption. For one thing, the losses between buffering efficient and clean electrical energy and converting it ready for use will become a topic for discussion. In the scale of terawatt hours, this becomes obvious: Even if a few percent flows bidirectionally, the fight against every tenth of a percent loss in these dimensions becomes important. Nevertheless, it is imperative to prioritize the required control activities around 50 Hz. In any event, the conflict of interests between grid stability and the accepted cumulated losses deserves to be included in the discussions on the type and use of the grid.

Enjoy reading this edition.

Robert Unseld
Responsible Editor

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