

Energizing the digital grid



Claes Ryttoft

Dear Reader,

Electricity is all around us. Whether we are at home or in the workplace, in a busy metropolis or in a remote outpost, electricity, whether directly or indirectly, enables almost everything we do. Electricity is in many respects an ideal means of transmitting and delivering energy, being controllable, safe, economic, efficient and relatively unobtrusive. Electrical transmission and distribution has been one of the main pillars of ABB's business since the early days and the company has always been at the forefront of pioneering and introducing new technologies.

Far from approaching an end point in terms of development, the entire electricity system is undergoing changes on a scale not seen since its inception. Traditionally, a small number of centralized power plants supplied the surrounding centers of consumption. Generation was dictated by demand levels and electricity flowed essentially in one direction. Today, we are seeing a rapid growth in renewables such as wind and solar, which are by nature subject to supply fluctuations. Furthermore this generation (as well as storage) is distributed over a myriad of locations and often integrated in consumer sites. A given site can thus arbitrarily change from being a net consumer to a net producer and the traditional model of one-way electricity flows is giving way to multi-directional flows. This is not only affecting the hardware of the transmission infrastructure but also the way it is operated. A balancing of generation and consumption can no longer rely purely on supply strictly following demand, but must be achieved by managing both supply and

demand. This requires sophisticated monitoring, communication and control systems across generation, transmission, distribution, storage and consumption.

This issue of *ABB Review* is dedicated to these developments, following how they affect different levels and components of the electrical network, from the long-distance transmission lines to local level developments such as microgrids, as well as the control and communication systems that will make the collaboration possible.

I would like to use this opportunity to remind you that besides the print edition, *ABB Review* is also available electronically. Please visit <http://www.abb.com/abbreview> for more information.

I trust that this issue of *ABB Review* will provide you with a deeper understanding of the grid of the future, and of some of the exciting challenges and opportunities it is creating, as well as showcasing ABB's ability to address these challenges and become an integral part of your energy future.

Enjoy your reading!



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