

## Editorial: Actual Questions in Power Engineering

Norbert Szedenik<sup>1</sup>

<sup>1</sup> Associate Editor, Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics, H-1521 Budapest, P.O.B. 91, Hungary

Our life cannot work without electricity. Recently, most of the researchers focus on information technologies, however computers, production plants, services, smart systems, households, and even traffic would stop in the lack of electricity. For the people, it is evident that they just simply plug their equipment into the outlet, and it will operate. A non-visible but a very serious background work is needed to have always the power in the socket and the quality of the service is also very important. Increasingly widespread switched-mode power supplies significantly distort ideal current shapes, so continuous monitoring must be done to ensure energy quality. The power supply network shall be designed and operated in such a way as to minimize blackouts due to failures and maintenance. In the same time, it is becoming increasingly important that energy will be “clean”. This means, not only the economical use, but its generation must not pollute our environment and its source shall be renewable. To achieve these goals, continuous research and development is needed. These results contribute to make our environment more liveable, cleaner and even greener.

Citius, altius, fortius! Faster, Higher, Stronger! This is the motto of the modern Olympic Games. Anyone who wants to stay in competition and even would like to win in the field of the power engineering, could formulate this triple goal as follows: more efficient, more reliable, more environmentally friendly. If these goals would be fulfilled, all of us will be “the winners”, since we can enjoy the advances of technology without destroying our living environment. The basis to achieve these goals is the continuous research and development. Some of the

representative results of this research work are presented in this issue. Most of the papers deal with current issues of renewable energy production, with the issue of wind energy and Photo Voltaic (PV) systems. One of the biggest problems with the use of wind and solar energy is that the available energy source is not in line with the energy demand. The balance between the generated energy and the energy demand can be achieved, for example, by using superconducting magnetic energy storage. Some papers discuss questions relating to this application and control of doubly fed induction generator applied in wind turbine systems. The reader can find some articles about permanent magnet synchronous generators and switched reluctance machine. With the development of semiconductor devices and the increase in the requirements of reliability of power electronics systems, there are higher expectations for converters too. Some articles deal with this issue by using different algorithms. Insulation tests are also a hot topic in energetics. One article gives a possible solution to determine the losses of high voltage sources as a function of frequency, using the power disparity method.

The articles published in this issue present the latest results of the research works carried out in the field of renewable energy technologies. It can be clearly seen that this field is being cultivated intensively in major research laboratories and universities worldwide. Most of the authors are Ph.D. students, which also indicates the actuality of the topic. This special edition about power engineering hopefully provides useful information for researchers and professionals either they are just getting to know the topic, either they already have a thorough knowledge in it.