Guest Editorial

Special Issue on Energy-Efficient Technologies—Crowd Energy Applications

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The disruption of digital technologies has been a reality in many different industrial sectors for many years. The digital transformation is now having an increasing impact on the energy sector as well as the so-called “smart environments”, e.g. bottom-to-bottom energy provision models (crowd energy) are no longer just theory but reality. The digital agenda is driven by the combined use of affordable sensors and information and communications technology (SICT). But there are also risks, both in terms of cybersecurity and management.

Energy efficient technologies and renewable energy technologies have developed from fringe innovations to a core component of multiple socio-technical systems, successfully competing with “conventional” technologies in various markets and being the focus of a sizable and ever-growing field of scientific research. The focus of applying energy efficient technologies to create “smart” and sustainable environments is the improvement of human well-being and reduced energy and resource consumption.

A higher degree of decentralization and crowd energy applications is the basis for a smarter future. In these environments, the roles of an increasing number of people are changing from customers to prosumers. For a successful and sustainable design of smart environments, it is essential to analyze and discuss not only technical dimensions, but also sociological, economic, and political aspects, all of whom combine to enable successful transitions to more sustainable systems of the future.

This Special Issue on Energy-Efficient Technologies—Crowd Energy Applications (EET-CEA) of the Journal of Electronic Science and Technology is dedicated to presenting the latest research and the most recent applications on energy issues, particularly in the focus of economic/socio-economic aspects, smart (building, living, city, home), crowd energy, cybersecurity, smart grid, and general power systems. For this edition of the EET-CEA Special Issue, we have received numerous highly qualified submissions, from which we have accepted seven papers after a very careful and diligent two-stage review process. It is noteworthy that economic considerations will be carried to the energy system topic from all authors’ nations.

The contributions cover the following topics:

• The integration of smart building energy data into smart grid applications in intelligent secondary substations;
• A mathematical model for pump schedule optimization taking into account demand-response block trading on spot energy markets;
• Malaysian grid management—a comparison of a photovoltaic park and a wind turbine farm from a monetary and non-monetary point of view;
• Knowledge sharing and distribution as key-steps for building to grid (B2G) and vehicle to grid (V2G) implementations in terms of smart city and crowd energy planning;
• The presentation of infrastructural and organizational aspects of the crowd energy concept as well as an investigation of energy prosumer behavior through the use of an interactive diorama;
• The analysis of business opportunities for Swiss small and medium sized enterprise (SME) considering the net present value of RE-investments in an uncertain economic environment;
• An overview of cybersecurity aspects in terms of crowd energy and smart living.

Fig. 1 shows the relationship between research fields and the nations where the research is conducted. The presentation is not representative, but it shows that the topics of smart environments, cybersecurity, and economic considerations in terms of energy systems are discussed on a broad scale.

As the guest editor of this special issue, I would like to express my sincere thanks to the authors from Austria, Bangladesh, France, India, Malaysia, and Switzerland for their contributions to this special issue. I would like to express my honest thanks to all reviewers and supporters. Finally, personally, but also on behalf of the authors, I would like to express my gratitude to the editorial team for their efforts and their everlasting support throughout the process. Very special thanks to Dr. Xuan Xie for the extremely professional support of this project.

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