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IEEE Communications Magazine Feature Topic Issue on “Green Communications”

The unprecedented expansion of wireline and wireless networks has resulted in increase in energy consumption and left a significant environmental footprint. Recently, it has been reported that energy costs can account for as much as half of a mobile service provider’s annual operating expenses. If the aggregate energy consumption of networking devices would follow the growth trajectories of Internet traffic (i.e., about 60% per year), the environmental and financial consequences will be dire. Thus, making ICT equipment and applications “greener” can not only have a tangible positive impact on environment, but also help operators attain long-term profitability. Moreover, green communications can help the world reduce dependence on fossil fuel, enable demand response and distributed energy resources, and ultimately achieve sustainable prosperity. Accordingly, a myriad of communications and information technologies have already been exploited by the global smart grid initiatives to empower conventional power grid to support two-way energy and information flow.

To meet the green communications challenges, we have to resort to a plethora of paradigm-shifting technologies, including but not limiting to energy-efficient network architecture & protocols, energy-efficient wireless transmission techniques, energy-efficient home networking, energy-aware backbone networks, Smart Grid, and opportunistic spectrum sharing without causing harmful interference pollution (e.g., Green Spectrum).

This IEEE Communications Magazine special issue (feature topic issue) aims to provide a comprehensive overview of the state-of-the-art in technology, regulation and standardization for “Green Communications”, and present a holistic view of research challenges and opportunities in the coming green era. Suggested topics include but not limit to the following:

- Energy-efficient circuit and device
- Energy-efficient transmission switching and routing technologies
- Energy-efficient base station architectures and networking
- Energy-efficiency in wired and wireless access networks
- Energy-efficiency in home and enterprise networking
- Energy efficiency of data centers and intelligent cloud computing
- Protocols and protocol extensions to enable energy efficient networks
- Network-wide cross-layer optimizations to minimize energy consumption
- Network load balance and smart information storage in distributed networks
- Instrumentation for energy consumption measurement
- Remote power management for wireless terminals and access networks
- Hierarchical and distributed techniques for energy management
- Harvesting distributed energy generation
- Smart Grid
- Information theory on energy efficiency
- Cognitive, cooperative and reconfigurable networks
- Energy evaluation and comparison of different network technologies
- Novel network concepts and architectures lowering the overall footprint of ICT (e.g., Compressed Sensing for network monitoring)
- Realistic estimation of the worldwide footprint of communications and future evolution
- Assessment of the footprint of individual communication devices, including life cycle assessment
- Regulation and standardization
- Deployment, trial experience, business models and applications (e.g., green multimedia broadcasting, femtocells)

Articles should be tutorial in nature and should be written in a style comprehensible to readers outside the specialty of the field. Authors must follow the IEEE Communications Magazine’s guidelines for preparation of the manuscript. Complete guidelines for prospective authors can be found at www.comsoc.org/pubs/commag/sub_guidelines.html. Please send PDF (preferred) or MS WORD formatted paper to Manuscript Central (<http://commag-ieee.manuscriptcentral.com>), register or log in, go to the Author Center and follow the instructions there.

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Guest Editors:

Honggang Zhang (honggangzhang@zju.edu.cn)

Zhejiang University, China

Andreas Gladisch (andreas.gladisch@telekom.de)

Deutsche Telekom Laboratories, Germany

Mario Pickavet (mario.pickavet@intec.ugent.be)

University of Ghent - IBBT, Belgium

Zhifeng Tao (tao@merl.com)

Mitsubishi Electric Research Lab (MERL), USA

Werner Mohr (werner.mohr@nsn.com)

Nokia Siemens Networks, Germany

