Preface

With the environmental consciousness and increasing of energy cost, efficient energy efficiency consumption has become one of the most important issues in wireless communication networks. The eco-friendly and renewable green energy, such as solar and wind energy, is emerging as a promising alternative energy source. It is anticipated that green energy will be widely adopted in next-generation wireless networks in order to sustain the ever-growing traffic demands, while mitigating the effects of increased energy consumption. Unlike traditional energy provided by electricity grid, green energy is replenished from nature and highly depends on the capacities and locations of the electronic devices. Thus, the fundamental design criterion in the network deployment and management is shifted from energy efficiency to energy sustainability due to the sustainable nature of green energy. In this brief, we focus on network planning, energy modeling and resource allocation by jointly considering cost and energy sustainability in wireless networks with sustainable energy. First, we present the characteristics of green energy and investigate existing energy-efficient green approaches for wireless networks with sustainable energy. Second, we study network planning and resource allocation issues based on statistical historic data in green wireless networks to minimize the cost and sustain network. We jointly consider the relay node placement and sub-carrier allocation (RNP-SA), and then formulate the network planning and resource allocation issues into a mixed integer non-linear programming problem. After that, two low-complexity heuristic algorithms, namely RNP-SA with top-down/bottom-up algorithms (RNP-SA t/b), are introduced to solve the non-linear programming problem in different network scenarios. Third, we try to address the random availability and capacity of the energy supply based on accurate energy harvesting and consumption information. Our goal is to maximize the energy sustainability of the network, or equivalently, to minimize the failure probability that the mesh access points (APs) deplete their energy and go out of service due to the unreliable energy supply, where the energy buffer of a mesh AP is modeled as a $G = G = 1(= N)$ queue with arbitrary patterns of energy charging and discharging. Based on the analysis, a distributed admission control strategy is proposed to guarantee high resource utilization and to improve energy sustainability. Finally, we conclude the brief and provide future research directions. It is anticipated that this brief will provide valuable guidance on the design of future sustainable wireless networks.

Springer

http://www.springer.com/978-3-319-02468-4

Sustainable Wireless Networks

Zheng, Z.; Cai, L.X.; Shen, X.S.

2013, IX, 59 p. 24 illus., 3 illus. in color., Softcover
ISBN: 978-3-319-02468-4