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## Energy Balancing in Wireless Networks with MIMO Communications

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Wireless networks are vital for supporting a range of applications. With the continuous development of wireless networks, energy conservation and energy efficiency are becoming key factors in improving the network lifetime. In conventional wireless networks, the nodes are equipped with a single antenna, and the energy conservation methods are needed since the nodes have limited capacity and may run out of energy. Although energy harvesting, which provides unlimited amount of energy to the nodes when ambient energy is available,

In multi-antenna wireless networks, however, the energy conservation problem can be addressed using the trade-off between the transmit power and the circuit energy consumption. Multiple-Input Multiple-Output (MIMO) communication is a promising approach that can be efficiently used in reducing the energy consumption for communication. In MIMO systems, the transmit power is spread among