# A Class of Energy Efficient MAC Protocols for Wireless Sensor Networks

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***Abstract*—The adoption of Wireless Sensor Networks for large area outdoor monitoring scenarios is currently considered one of the most challenging applications for this emerging technology. The promise of an unmanaged, self-assembling and self-powered wireless infrastructure, with a continuously decreasing cost per unit, attracts the attention of both final users and system integrators, demanding for flexible, reliable and suitable solutions, aimed at replacing previously deployed wired solutions or at opening new business opportunities. Even if many outdoor monitoring applications (i.e. environmental monitoring) are not demanding for strictly real-time performances, since the monitored parameters can be considered slowly varying, smart power saving procedures have to be adopted especially where a long life time is expected for unmanaged and battery operated networks.**

**A common approach is to introduce a low power sleep mode, where the node's radio section is switched off. In *ad-hoc* networking scenarios, this definitely requires the adoption of synchronization procedures, allowing the nodes to transmit when one or more of its neighbors are listening and, therefore, not in sleep mode. In this paper, a class of MAC layer protocols, aimed at efficiently supporting the node's low power mode, is presented and analyzed, referring to a realistic user defined scenario; the results of this work will be implemented in a being deployed Pilot Site, oriented to wine production phase monitoring.**