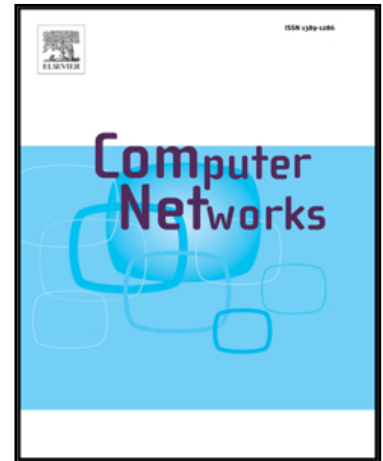


## Accepted Manuscript

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PII: S1389-1286(18)30088-4  
DOI: [10.1016/j.comnet.2018.02.021](https://doi.org/10.1016/j.comnet.2018.02.021)  
Reference: COMPNW 6419



To appear in: *Computer Networks*

Received date: 22 August 2017  
Revised date: 25 January 2018  
Accepted date: 14 February 2018

Please cite this article as: Heng Zhang, Wei Xing Zheng, Optimum Transmission Policy for Remote State Estimation with Opportunistic Energy Harvesting, *Computer Networks* (2018), doi: [10.1016/j.comnet.2018.02.021](https://doi.org/10.1016/j.comnet.2018.02.021)

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# Optimum Transmission Policy for Remote State Estimation with Opportunistic Energy Harvesting<sup>☆</sup>

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## Abstract

An attractive research direction in energy harvesting wireless networks is to balance the energy transfer and data transmission concurrently. In this paper, we consider the scenario that a transmitter can send the state information of a physical process to a remote estimator or deliver the energy to an energy receiver. It is assumed that the communication channels between the transmitter and the remote estimator and energy receiver sides are block fading. We formulate a problem that weighs the estimation error at the remote estimator side with the harvested energy at the energy receiver side. For the case that the realtime channel state information is known by the transmitter (called full channel state information and FCSI for short), we respectively find out the optimal transmission power switch policy and power split policy. Moreover, these results are further generalized to the case that the realtime channel state information is unknown and the statistical characteristics of the communication channels are known by the transmitter (called

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<sup>☆</sup>This work was supported in part by a research grant from the Australian Research Council.

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