Long-Term Power Procurement Scheduling Method for Smart-Grid Powered Communication Systems

ABSTRACT

With the emergence of smart grids, adopting dynamic energy pricing models have become both possible and desirable. With such a pricing dynamicity, great savings in energy costs can be achieved in telecommunication systems when energy is procured efficiently through carefully designed realtime resource schedulers. In this work, we propose an efficient online power procurement and allocation scheduler that maximizes a long-term system utility function without the need for prior knowledge of future system information, where the system utility function is expressed in such a way that the gain coming from serving the users and the cost of the procured energy are traded off for one another. We propose an approach that allows to derive closed-form instantaneous energy procurement and resource allocations that are function only of the actual instantaneous system parameters. Using simulations, we study the efficiency of the proposed approach under various parameters, and quantify the energy costs our approach can potentially save.

EXISTING SYSTEM

- In existing system, the scheme to power BSs using smart grids with consideration of real-time power prices provided by the smart grid and pollution levels resulting from the power.
- A framework for a smartgrid powered LTE system and introduced a power allocation strategy based on evolutionary algorithms but did not address on power procurement over time.

PROPOSED SYSTEM

- We propose an optimal online power procurement and allocation scheme that does not require the availability of future information, but rather rely on statistical distributions to efficiently schedule the procurement decisions and allocate the available resources.
- The proposed approach allows to decompose the problem into per-time slot sub-problems, thereby allowing to solve each time slot decisions independently.
- Mainly, the available power at each instant needs to be sufficient to achieve the minimum rate requirements of all users.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

REFERENCE

[1] X. Yu and Y. Xue, “Smart grids: A cyber-physical systems perspective,” Proc. IEEE, vol. 104, no. 5, pp. 1058–1070, May 2016.

[2] F. Li, W. Qiao, H. Sun, H. Wan, J. Wang, Y. Xia, Z. Xu, and P. Zhang, “Smart transmission grid: Vision and framework,” IEEE Trans. Smart Grid, vol. 1, no. 2, pp. 168–177, Sep. 2010.

[3] N. Komninos, E. Philippou, and A. Pitsillides, “Survey in smart grid and smart home security: Issues, challenges and countermeasures,” Commun. Surveys Tuts., vol. 16, no. 4, pp. 1933–1954, Fourthquarter 2014.

[4] E. M. Neira. (2015, Jan.) IEEE ComSoc CTN Special Issue on Ten Trends That tell where Communication Technologies are Headed in 2015. IEEE ComSoc Technologies News. [Online]. Available: http://www.comsoc.org/ctn/ieee-comsoc-ctn-special-issueten- trends-tell-where-communication-technologies-are-headed-2015

[5] H. Al Haj Hassan, L. Nuaymi, and A. Pelov, “Renewable energy in cellular networks: A survey,” in Proc. IEEE Online Conference on Green Communications (GreenCom), Oct. 2013, pp. 1–7.