# Multiscale stochastic prediction of electricity demand in smart grids using Bayesian networks.

**Autores:** Bassamzadeh, Nastaran[1] *Bassamza@usc.edu*
Ghanem, Roger[2] *Ghanem@usc.edu*

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**Resumen:** Demand management in residential buildings is a key component toward sustainability and efficiency in urban environments. The recent advancements in sensor based technologies hold the promise of novel energy consumption models that can better characterize the underlying patterns. In this paper, we propose a probabilistic data-driven predictive model for consumption forecasting in residential buildings. The model is based on Bayesian network (BN) framework which is able to discover dependency relations between contributing variables. Thus, we can relax the assumptions that are often made in traditional forecasting models. Moreover, we are able to efficiently capture the uncertainties in input variables and quantify their effect on the system output. We test our proposed approach to the data provided by Pacific Northwest National Lab (PNNL) which has been collected through a pilot Smart Grid project. We examine the performance of our model in a multiscale setting by considering various temporal (i.e., 15 min, hourly intervals) and spatial (i.e., all households in a region, each household) resolutions for analyzing data. Demand forecasting at the individual households' levels is a first step toward designing personalized and targeted policies for each customer. While this is a widely studied topic in digital marketing, few researches have been done in the energy sector. The results indicate that Bayesian networks can be efficiently used for probabilistic energy modeling in

residential buildings by discovering the dependencies between variables. [ABSTRACT FROM AUTHOR]



**Afiliaciones del autor:** [1]Department of Civil Engineering, University of Southern California, Los Angeles, CA 90089, USA
[2]Viterbi School of Engineering, University of Southern California, Los Angeles, CA 90089, USA

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