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# Evaluation of Short-Term Load Forecasting Techniques Applied for Smart Micro-Grids

**Authors :** Xiaolei Hu, Enrico Ferrera, Riccardo Tomasi, Claudio Pastrone

**Abstract :** Load Forecasting plays a key role in making today's and future's Smart Energy Grids sustainable and reliable. Accurate power consumption prediction allows utilities to organize in advance their resources or to execute Demand Response strategies more effectively, which enables several features such as higher sustainability, better quality of service, and affordable electricity tariffs. It is easy yet effective to apply Load Forecasting at larger geographic scale, i.e. Smart Micro Grids, wherein the lower available grid flexibility makes accurate prediction more critical in Demand Response applications. This paper analyses the application of short-term load forecasting in a concrete scenario, proposed within the EU-funded GreenCom project, which collect load data from single loads and households belonging to a Smart Micro Grid. Three short-term load forecasting techniques, i.e. linear regression, artificial neural networks, and radial basis function network, are considered, compared, and evaluated through absolute forecast errors and training time. The influence of weather conditions in Load Forecasting is also evaluated. A new definition of Gain is introduced in this paper, which innovatively serves as an indicator of short-term prediction capabilities of time spam consistency. Two models, 24- and 1-hour-ahead forecasting, are built to comprehensively compare these three techniques.

**Keywords :** short-term load forecasting, smart micro grid, linear regression, artificial neural networks, radial basis function network, gain
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