Smart Control of the Demand Side Management in a Municipality for Residential Water Heating

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Abstract:
Load shedding is the single biggest constraint on South Africa's economic growth and life quality of citizens, while the generation capacity increase is placed as the immediate measure, the demand management is also considered as the significant measures for both short-term and long-term. Residential (household) demand is a significant share of South Africa's total electricity demand (≈202 TWh equivalent), typically around 20–25% of the national total, with the remainder supplied by commercial, industrial, and public sector users, among the residential demands, the residential water heating is the main user. The municipalities in South Africa have been implementing various Demand Side Management (DSM) interventions, the landscape of grid-network-management has however changed drastically over the last few years thanks to the frequency and intensity of loadshedding, traditional DSM systems are simply not able to keep up with this changed environment. To address the challenges faced by the traditional interventions, a new demand side management intervention based on the characteristics of water heating process was proposed for the development of a smart meter, the performance of the smart meter was measured and verified for roll out.

Keywords:
Demand side management, residential water heating, municipality, smart meter.