

## Electrical grid stability enhancement using smart home Frequency-response Grid - Friendly Appliance System

### ABSTRACT

Load shedding is a powerful scheme used for corrective and preventive measures; corrective to restore system's stability and preventive to avoid catastrophic failure. However, the affected end users are deprived of power supply absolutely with no choice. This paper presents the design, development, feasibility and merits of Frequency-response Grid - Friendly Appliance System (FRGFAS) in a smart home. FRGFAS is a decentralized Adaptive Load Shaving(ALS) device that supports grid's system stability by sensing grid's frequency deterioration level and turns ON/OFF loads accordingly. The FRGFAS permits end users to carry out load shaving at their scale of preference in smart homes via flexible demand responses and automates outdoor lighting to optimum operational hours. FRGFAS obviate load shedding by shaving loads whenever the system is in distress and reset loads supply to the normal state when it stabilizes, this Consequently increases the end user comfort zone and averts a blackout.

**Keyword:** Adaptive load shaving; FPGA; Frequency response; Grid Friendly Appliance; Load management; Smart home