

# Provision of secondary frequency control via demand response activation on thermostatically controlled loads: Solutions and experiences from Denmark - DTU Orbit (09/11/2017)

## Provision of secondary frequency control via demand response activation on thermostatically controlled loads: Solutions and experiences from Denmark

This paper studies the provision of secondary frequency control in electric power systems based on demand response (DR) activation on thermostatically controlled loads (TCLs) and quantifies the computation resource constraints for the control of large TCL population. Since TCLs are fast responsive loads, they represent a suitable alternative to conventional sources for providing such control. An experimental investigation with domestic fridges representing the TCLs was conducted in an islanded power system to evaluate the secondary frequency control. The investigation quantifies the flexibility of household fridge performance in terms of response time and ramp-up rate, as well as the impact on fridge temperature and behaviour after the control period. The experimental results show that TCLs are fast responsive loads for DR activation, with the average control signal response time of 24 s and an equivalent ramping rate of 63% per minute, which could also comply with the requirements for primary frequency control.

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