

The METER project: a study of energy demand flexibility through activity sequencing

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To achieve deep decarbonisation of our energy systems, citizens will play an increasingly important and participatory role. Demand side flexibility has the potential to reduce the need for peaking capacity, storage and grid reinforcement. The METER project is the first study of its kind, collecting time use and electricity data alongside a rich set of socio-demographic parameters at a nationally representative scale. Activities, socio-demographic data and information about routines are collected from all household members above the age of 8 using a custom app. Simultaneously, high resolution household electricity recordings are taken. The relationship between these multivariate types of information need be explored for novel insights into temporalities, causes, constraints and diversity of energy services across society.

Activities are categorised using a system of existing time-use codes, representing behavioural sequence as a finite-dimensional vector. Analysis of such highly dimensional data is naturally best carried out using standard frameworks of complex systems: (multilayer) networks, information-theoretic time-series measures, etc. Once typical dependencies (e.g. behavioural routines) are identified, there is scope of modelling representative behaviour. This would substantiate the evidence of a more targeted approach to encourage demand side flexibility than the mere provision of price signals, currently proposed by some economic and engineering disciplines.

Your electricity profile

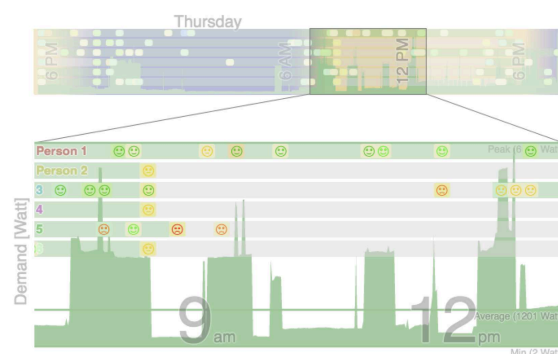


Figure 1: A snapshot of experimental data of a 6-person household, showing 28 hours of electricity reading (green), overlaid with reported activities (squares). Interactive webpages like this one are sent to users after receiving their data.