

Home energy management and automation: Prosumer attitudes and behaviour

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It is widely acknowledged that least-cost pathways to a distributed energy system with higher penetrations of renewable generation will involve demand-side management (DSM) to help manage the network and a number of approaches have been trialled in the NEM, including automated or behavioural demand response using hot water, air-conditioning, batteries or other loads. While it is encouraging that Energy Consumers Australia report that 45% of energy users are willing to reduce their energy use during periods of high demand, with an additional 25% willing if they are properly incentivised (ECA 2019), the difficulty of user engagement has been a recurrent theme in findings from many of these trials.

Here, we present a study of prosumer motivations, behaviours and attitudes in respect to home energy management systems (HEMS) and automation. We combine data from 161 responses to an online survey of households with solar generation, energy monitoring and/or load control, with in-depth interviews with 24 of the participants. The results reveal that multiple complementary and conflicting motivations combine in decisions regarding investment in distributed energy resources and in load management decisions. While 85% of respondents with real-time solar monitoring use the data to help manage their energy use, with nearly half of these describing load-shifting behaviour to maximise solar self-consumption, few were able to quantify the energy or bill savings achieved by these behaviours.

Availability of loads for shifting or demand response are constrained by lifestyle and behavioural factors as well as by characteristics of specific energy services. Households have a range of needs and wants from HEMS, which can be segmented by daytime occupancy and personal preferences of household members towards automation. Amongst this energy-engaged cohort, attitudes towards the use of household assets to assist with grid balancing are broadly positive, but many stressed the need for fairness and trust in the management of demand response.

Our findings suggest the need to address multiple motivations and modes of engagement in engaging users in demand side management.

References

ECA 2019. 'Energy Consumer Sentiment Survey June 2019', Energy Consumers Australia