CONSUMER BEHAVIOUR

The price of flexibility

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As consumers become prosumers feeding energy back into the grid, the burden of flexibility to address supply–demand mismatch will also have to be increasingly shared between the users and the utility. To quantify the extent to which current and potential prosumers will be willing to co-create flexibility for the utility, Merla Kubli and colleagues from Switzerland solicit user choices and calculate the 'discomfort costs' the utility may have to bear in order for the users to accept contracts that allow the utility more flexibility in managing users' renewable resources.

The researchers conducted 3 studies of about 300 potential or existing users of photovoltaic (PV)-battery, electric vehicles (EV) and heat pumps. They were presented with eight contract options to choose from. The contract modalities varied from 'super flex', giving a lot of flexibility to the utility (which for EV users for instance meant getting only 40% guaranteed charging level) to 'no flex' (where the utility had no access to the EV battery). Monthly power costs to the user decreased as flexibility for the utility increased. The researchers found that PV-battery and EV users were more willing to give the utility more flexibility than to compromise on the fuel mix for the electricity, preferring renewable sources. By taking a ratio of the change in number of users that were willing to give the utility more flexibility against the respective reduction in costs, researchers estimated that on average for about US$16, US$47 and US$383 per month, the PV-battery, EV and heat pump users, respectively, choosing 'no flex' contracts may be willing to opt into 'super flex' contracts. This 'discomfort cost' provides a useful metric to quantify user willingness to co-create flexibility and can be used in planning and designing distributed grid systems.

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