Who gains from hourly time-of-use retail prices on electricity? An analysis of consumption profiles for categories of Danish electricity customers

Studies of the aggregated hourly electricity load in geographical areas typically show a systematic variation over the day, the week, and seasons. With hourly metering of individual customers, data for individual consumption profiles have become available. Looking into these data we show that consumption profiles for specific categories of customers are equally systematic but quite distinct for different categories of customers. That is, different categories of customers contribute quite differently to the aggregated load profile. Coupling consumption profiles with hourly market prices which also include a systematic component in the hourly variation, we show that customers with different consumption profiles experience different average cost of their electricity consumption when billed according to hourly time-of-use prices. Thus, some categories of customers stand to gain from time-of-use pricing, while others stand to lose. In Denmark, typically industry, private services and households stand to lose, whereas agriculture and public services stand to gain from time-of-use pricing. However, differences within categories of customers are considerable and, for example, industrial companies running 24 h a day tend to gain from a time-of-use pricing. © 2014 John Wiley & Sons, Ltd.