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Data for aggregated hourly electricity demand shows systematic variations over the day, week, and seasons, and forecasting of aggregated hourly electricity load has been the subject of many studies. With hourly metering of individual customers, data for individual consumption profiles is available. Using this data and analysing the case of Denmark, we show that consumption profiles for categories of customers are equally systematic but very different for distinct categories, that is, distinct categories of customers contribute differently to the aggregated electricity load profile. Therefore, to model and forecast long-term changes in the aggregated electricity load profile, we identify profiles for different categories of customers and link these to projections of the aggregated annual consumption by categories of customers. Long-term projection of the aggregated load is important for future energy system planning, and the hourly load profile is an important input to energy system models that serves this purpose. In particular, these models often assume an unchanged hourly load profile (although the level may change). In contrast, our model suggests that the hourly load profile also changes as the shares of consumption by categories of customers change and new consumption technologies such as electrical vehicles and (for Denmark in particular) individual heat pumps are introduced. © 2013 Elsevier Ltd. All rights reserved.

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