

More electric vehicles mean new adaptive pricing for electricity is vital

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Adaptive pricing is needed to ensure grid stability as demand for Electric Vehicles increases, according to research by the University of Cologne.

The pricing scheme, created by Professor Wolf Ketter and his co-authors Konstantina Valogianni, John Collins and Dmitry Zhdanov, is based off of mathematic modelling and real-world data, which adapts to customer responses and market conditions.

This is needed as the increase in the number of electric vehicles creates new challenges, as significant amounts of electricity demands need to be managed to ensure grid stability.

Grid stability is when there is a balance between production and consumption to ensure that the frequency remains stable. If the frequency in the grid falls or rises, electrical devices and even important generators can be damaged.

“A transition to electric vehicles is widely assumed to be an important step along the road to environmental sustainability, however, large scale adoption of electric vehicles may put electricity grids under critical strain, since peaks in electricity demand are likely to increase radically,” says Professor Wolf Ketter.

Grid operators and energy providers can use adaptive pricing to influence the electric vehicle charging demand in their portfolios towards a desired outcome, preventing any instability.

To induce a desired electricity demand profile, grid operators broadcast prices to the electric vehicle population, these prices influence the overall electric vehicle charging demand and can be used as signals to shape it.

The research shows that adaptive pricing can yield robust results even when owners deviate from the pre-assumed way of reacting to prices, making it preferable to current price schemes.

“The pricing scheme will distribute part of peak demand by making it more cost-effective to charge their car in non-peak times. This will distribute demand in order to alleviate the grid infrastructure and ensure reliable operation,” says Professor Ketter.

The paper was published in the Journal Production and Operations management.

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