

Management strategy to mitigate power demand surges, increase grid reliability and reduce costs

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Concerns are mounting among policymakers and utility companies amid the impact of severe weather on the nation's electrical grids. In recent months, electrical grids in Texas have been tested to the point of near failure. So it seems like perfect timing that new research in the journal *Management Science* identifies a new method that provides the best way to utilize "direct load control contracts" to mitigate electricity demand surges, increase grid reliability and reduce electricity cost. All of this right down to the individual household.

"With this tool, utilities can quickly determine which customers to reduce power to, and for how long, while limiting the amount of time in a year that any one customer is affected," says Ali Fattahi of Johns Hopkins University. "Direct load control contracts affect only households that volunteer (in exchange for a break on their electricity bills)."

The study, "Peak Load Energy Management by Direct Load Control Contracts," finds that by allowing utilities to mitigate demand surges by controlling [air conditioners](#) and other devices in residential and commercial units, more reliance can be placed on electrical grids, calming fears nationwide.

This research provides a more efficient way to design direct load control contracts to reduce total cost of generating electricity during peak times.

"Let's say you're going to be away from your house for an extended period, one or two months. With this program, you can coordinate with the power company to reduce the load your house is placing on the grid during that time, freeing up energy that can be directed to people on your [grid](#) who are home," says Fattahi.

Fattahi, alongside study co-authors, Sriram Dasu and Reza Ahmadi of the University of Southern California, Los Angeles, say that while utilities could rely on rolling blackouts or widespread brownouts to reduce peak demand, demand-response mechanisms such as direct load control contracts mean that [power](#) cuts will affect only households that volunteer.

To test the model, the authors used [electricity](#) consumption figures for three California utilities between 2009 and 2014.

"Our results suggest the model could reduce the utilities' peak-demand energy costs by about 5%. And it showed a reduction in summer peak demand from 36,000 to 32,000 megawatt hours," says Dasu, professor in the Marshall School of Business at the University of Southern California, Los Angeles.

More information: Ali Fattahi et al, Peak-Load Energy Management by Direct Load Control Contracts, *Management Science* (2022). [DOI: 10.1287/mnsc.2022.4493](#)

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