

# Consumer savings, price, and emissions impacts of increasing demand response in the Midcontinent electricity market

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## Executive Summary

One of the most significant challenges associated with the development of wholesale electricity markets is the lack of demand-side participation. The Midcontinent Independent System Operator (MISO) wholesale electricity market in the United States historically has underutilized the demand response resources available in its territory. The analysis presented in this paper estimates consumer savings, CO<sub>2</sub> emissions reductions, and price effects from increasing demand response (DR) dispatch in the Midcontinent Independent System Operator (MISO) electricity market. The MISO market is among the largest wholesale electricity markets in the world by geographic scope and market value. The market was originally created to facilitate the participation of large, centralized generation resources without much consideration to alternative resources like DR. These conditions create a unique set of state-jurisdictional regulatory and market rule challenges that do not exist in other large competitive wholesale markets, warranting a region-specific study.

To quantify market effects, we develop a bottom-up, dynamic supply and demand model to explore a range of DR deployment scenarios. We show annual consumer savings from increased market-based DR can vary from \$1.5 million to \$18.5 million under typical peak operating conditions, depending on the amount of DR resources available for market dispatch and the

frequency of deployment. Consumer savings and other market effects increase exponentially during atypical periods with high prices. Additionally, we find that DR deployment often reduces CO<sub>2</sub> emissions. However, the magnitude of emissions reductions varies depending on the emissions content of marginal generation at the time and location of deployment as well as the magnitude of demand shifting. The results of this study suggest regulators and other stakeholders should focus policy efforts to reducing regulatory barriers to DR deployment, particularly in locations that experience high price spikes, to improve market efficiency and achieve cost savings for consumers.

**Keywords:** Energy Economics, Energy Policy, Demand response, Electricity markets

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**L94** Industrial Organization: Industry Studies: Transportation and Utilities: Electric Utilities

**L98** Industrial Organization: Industry Studies: Transportation and Utilities: Electric Government Policy

**Q41** Energy: Demand and Supply - Prices

**Q48:** Energy: Government Policy